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B-1B DEFENSIVE AVIONICS SYSTEM

HEARING

BEFORE THE

SUBCOMMITTEE ON STRATEGIC FORCES AND NUCLEAR DETERRENCE

OF THE

COMMITTEE ON ARMED SERVICES UNITED STATES SENATE

ONE HUNDREDTH CONGRESS

SECOND SESSION

OCTOBER 4, 1988

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CONTENTS

CHRONOLOGICAL LIST OF WITNESSES

	Page
Hall, Maj. Gen. Michael D., USAF, Director for Strategic Special Operations Forces and Airlift Programs, Office of the Assistant Secretary of Air Force (Acquisition)	2
Slinkard, Brig. Gen. John D., USAF, Director of Contracting and Manufacturing Policy, Office of the Assistant Secretary of Air Force (Acquisition)	11

B-1B DEFENSIVE AVIONICS SYSTEM

TUESDAY, OCTOBER 4, 1988

U.S. SENATE,
SUBCOMMITTEE ON STRATEGIC
FORCES AND NUCLEAR DETERRENCE,
COMMITTEE ON ARMED SERVICES,
Washington, DC.

The subcommittee met in executive session, pursuant to notice, at 10:03 a.m. in room SR-232A, Russell Senate Office Building, Senator J. James Exon (chairman) presiding.

Present: Senators Exon, Nunn, Levin, and Symms.

Staff present: Arnold L. Punaro, staff director; Robert G. Bell, Robert F. Bott, Sherri Wasserman Goodman, William E. Hoehn, Jr., Ronald P. Kelly, T. Kirk McConnell, and Michael J. McCord, professional staff members; Mickie Jan Wise, staff assistant.

Also present: Jeffrey B. Subko, assistant to Senator Exon; Gregory J. Weaver and Elise J. Bean, assistants to Senator Levin; William J. Lynn, assistant to Senator Kennedy; Edward M. McGaffigan, Jr., assistant to Senator Bingaman; Milton D. Beach, assistant to Senator Glenn; Leon Fuerth, assistant to Senator Gore; James M. Bodner, assistant to Senator Cohen; and Andy Johnson, assistant to Senator Exon.

OPENING STATEMENT OF SENATOR J. JAMES EXON, CHAIRMAN

Senator EXON. The subcommittee will please come to order.

I welcome you, General Hall and General Slinkard. Thank you for being here this morning. I thought we would begin in closed session until sometime around the hour of 11:30 a.m., and then go into open session. Would that give you sufficient time to make your presentation on this subject and have some questions in closed session before we go into open session?

General HALL. Yes, sir, ample time.

Senator EXON. We understand this is a closed session. If we run into anything during this part of the presentation that you would like to warn us against not getting into in open session, I would appreciate your mentioning that. If there are some things that you think are particularly sensitive, would you please mention that?

General HALL. Mr. Chairman, we will do that.

Senator EXON. The Subcommittee on Strategic Forces and Nuclear Deterrence meets this morning to receive testimony on the B-1B bomber program. We plan to have two sessions with our witnesses today, first a closed session and then an open one. In the closed session we hope to gain a thorough understanding of the current knowledge of the problems with the defensive avionics of the air-

plane and how these problems will impact its penetration capability now and in the future.

We also need to understand the prospects, options, and the potential costs of fixing these problems and the wisdom of undertaking the remedial action.

It is an established fact that we have once again entered an era of austerity for the Defense budget. Within these overall constraints, our investments will be even scarcer. With the strategic forces part of the budget, in turn, it is clear that very difficult choices must be made The share of the strategic investment fund already planned for the bomber force is up sharply, begging the question of affordability.

At the same time, certain proposed counting rules for a potential START regime, for better or worse, appear to place a premium on penetrating bombers. The issue of penetrating capabilities, the cost of improvements thereto, and the return on the investment are critical. To formulate sound arms control, force modernization and force mix alternatives, we have to know as soon as possible how long and how well the B–1 can penetrate and at what total cost.

The timing of this hearing appears to be very proper, in light of the recent completion of the Institute of Defense Analysis study of the B–1 penetrating capability, the ongoing Defense Science Board's assessments, and the Air Force's own insights into the B–1B problems gained from the latest test results.

During the open session part of this hearing this morning we hope to get as much as we prudently can on the record concerning these issues. Also in this open session, we shall explore some of the contracting and liability aspects of the B–1 defensive avionics program, although the need to avoid prejudicing any potential legal proceedings may preclude us from pursuing certain lines of inquiry as much as we may like.

I know this issue is of particular interest to Senator Levin and others.

We have two Air Force witnesses here this morning. The first is Maj. Gen. Michael Hall, who is the Director for Strategic, Special Operations Forces and Airlift Programs in the Office of the Assistant Secretary for Acquisition. The second witness is Brig. Gen. John Slinkard, who is Director of Contracting and Manufacturing Policy, also under the Air Force Secretary for Acquisition.

I want to welcome you, gentlemen. We are pleased to have you and thanks for coming. We will now proceed in any fashion that the two of you would like. Others of our colleagues will be joining us this morning, but to try to keep on schedule I yield to you at this time, General Hall, and you may proceed in any fashion you wish.

STATEMENT OF MAJ. GEN. MICHAEL D. HALL, USAF, DIRECTOR FOR STRATEGIC SPECIAL OPERATIONS FORCES AND AIRLIFT PROGRAMS, OFFICE OF THE ASSISTANT SECRETARY OF AIR FORCE (ACQUISITION)

General HALL. Thank you, Mr. Chairman.

What I would like to do first is update you on the B–1. You know, it is, within the month, exactly 2 years ago that the B–1 met

its initial operational capability when those first 15 aircraft were fielded at Dyess Air Force Base. There have been a lot of changes since then, and I would just like to touch on those.

We were over to talk to you, to testify, on April 15. Since then we have delivered all 100 aircraft. We did that 2 months ahead of schedule. Over the last year, we broke some 36 world records for speed, payload, and range, and all that with an aircraft that had just come off the production line.

Two years ago I thought the terrain-following system was going to be as big a problem as the defensive system. Today, the terrain-following testing has progressed to the point where we are flying 200 feet over mountainous terrain, which is indeed an eyewatering experience if you consider the size of the aircraft and the maneuvers that it has to perform.

Operationally, the Strategic Air Command crews are flying at 200 feet over flat and rolling terrain and 500 feet in the mountains and, of course, are cleared to the full capability of the system in the event they were called into wartime crisis.

Flight control testing is also progressing, and we have initiated modifications to the aircraft. One of those that is being implemented now increases the low-level TF entry weight of the aircraft by some 50,000 pounds. That translates to an increase in low-level range of over 730 nautical miles from the range that they have with the current aircraft.

Initial precautionary restrictions which precluded operation of the offensive and defensive systems at the same time have been lifted as a result of flight testing also. And TF fly-ups, which have been commented on a number of times, the specification calls for no more than one fly-up every 15 minutes. We are now experiencing less than one fly-up every 50 minutes, and SAC crews that we have had here in town last week on a B–1 symposium at the National Press Club indicated that they had the offensive systems operator induce a fly-up just so the pilots will know the procedures to go through in the event of a fly-up. So that problem has pretty much gone away.

Weapons certification is coming along well. The nuclear gravity bombs and SRAM–A have been certified, of course, since IOC. We have also completed testing on the air-launched cruise missile internal carriage. External Advanced Cruise Missile work is being done and, as I believe you are aware, Mr. Chairman, there has been a high vibration, or what we call acoustical level vibration on some of the aft stations that is currently under investigation for ACM, or Advanced Cruise Missile, carriage externally.

Conventional weapons testing. We have dropped some 81 500-pound bombs in 1.7 seconds. That certification we expect to be completed next month, in November, so that will include the conventional weapons and the racks that we need to carry them.

Operationally, we now have 108 combat-ready crews fully trained and ready to go, and I think, sir, if you have spoken to them they really enjoy flying this aircraft.

Last spring when I talked to you, we had 12,000 total hours on the B–1B air frame. In just 6 months we are now up to 25,000 total hours, and of course the maturity index, the fully mature system

will be 200,000 hours. That is estimated in 1994. That is when the logistics system and everything is up to full maturity.

Speaking of logistics, we are working hard on the retrofits and spares, parts delivery. We have had approximately 25 percent of the aircraft—while we are accruing that flight time, that 25,000 hours, we have had approximately 25 percent of the fleet tied up in retrofit. One of them was the bird strike mod, which we now have 53 of the 100 aircraft modified, and the flight control mods, which I mentioned earlier, which will increase our gross weight capability greatly.

We expect the spare parts back order to be filled by next year, 1989, and we also are tracking very hard those items which are called bad actors that affect maintenance the greatest, and trying to get those either fixed, modified, changed, so that they do not hold down the aircraft due to maintenance.

Finally, fuel leaks have stabilized, and we believe are isolated predominantly to those earlier aircraft that came off the production line, because the later aircraft at McConnell and Grand Forks are experiencing very low fuel leak problems for an aircraft at this stage of its development.

So on all fronts we believe we have made significant progress since that IOC 2 years ago. The bottom line is we have got a highly capable weapons system out there with, I might say, fully qualified and enthusiastic crews to operate it, and the logistics system is in the process of maturing. As promised, the B–1B is an effective penetrator, we believe, today, tomorrow, and it will be into the future.

The recently-concluded independent assessment of the B–1B which you mentioned earlier, Mr. Chairman, indicated its penetration capabilities and has confirmed what CINCSAC, General Chain, and our Chief of Staff, General Welch, have stated for the record. The B–1 is fully capable of performing the penetration mission that was promised.

Now I would like to address, and I would like to use some slides to do it, the last major hurdle, I believe, the defensive system, which I know is the primary focus you would like to have this morning.

Senator EXON. It is fair to say, General, that you have made significant progress in solving the problems of the B–1B. You have not been given much, if any, credit for that in the press. The most prominent things that I can think of presswise on the B–1B is that it was a miracle that it was turned around and ever produced; second, it was obviously a very fragile aircraft because if one little tiny bird can bring down that airplane it could not be very well built; and, third, the more recent publicity that it has been rampant with avionics failures and came in far below the original goal in standards. In short, that the airplane is not any good anyway.

I think those of us who have followed this program very closely do not agree with that consensus at all, but I do think we can all agree on one thing, and that is that the ECM is the major and, from your testimony so far this morning, the only major problem we have with the B–1B today. Is that a fair layman's estimate of the situation?

General HALL. Yes, sir, that is correct.

Senator EXON. Go ahead.

B-1B PROGRESS REPORT

OVERVIEW

B-1B Capabilities.
Penetration Elements.
B-1B ECM Plan.

General HALL. Mr. Chairman, this is what I intend to brief with respect to the ECM system—the capabilities today—and also I am going to address briefly the elements which make up a penetrating capability for a bomber—those things other than ECM that contribute—and then what our game plan is for the B-1B.

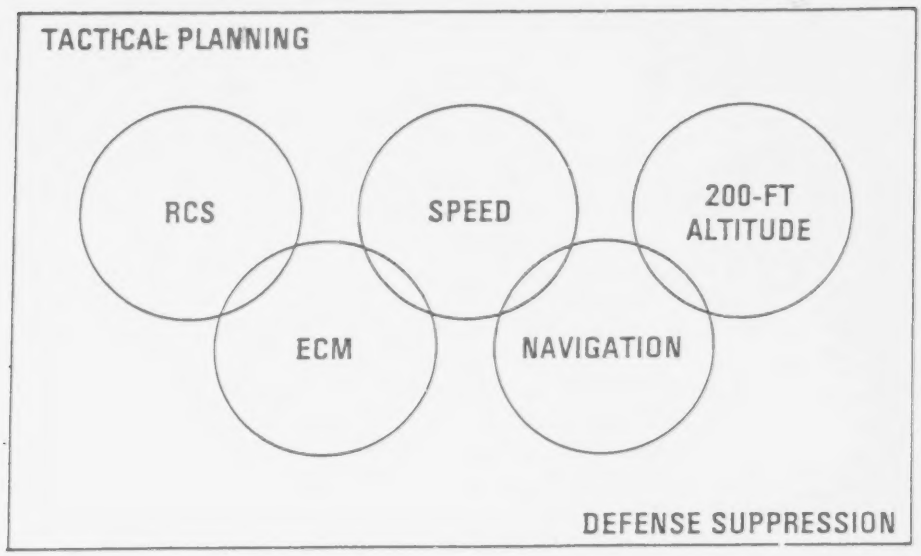
[Slide deleted.]

If we look at it overall—and this really hones in on what you just mentioned—there are seven areas here that we have addressed as the major capabilities of the B-1, and in six of those we believe we are at full capability today. We have a low altitude automatic terrain-following capability. We have the speed for penetration at .85 mach. We have a navigation system, the accuracy of which, for me as a fighter pilot who grew up with some of the first inertial nav sets, it is hard to even imagine the capability and accuracy in the B-1B. It is there today.

The low radar cross-section is there, has been since the B-1B came out. The intercontinental range, as we mentioned, and we are even increasing that as we improve the flight control systems so we can add more fuel to the aircraft. The weapons payload and accuracy is certainly there. With the gravity weapons we are approximately one-half of the SAC requirement. In other words, we are twice as accurate; let me voice it that way. And the same with SRAM.

The area that is left is electronic countermeasures, in which we have a limited capability and we need to improve, and that is what I will home in on.

THE PENETRATION ELEMENTS



The next slide, I did not think about this until we got over here, but I guess in the Olympic tradition we will show it that way. Basically, the penetration elements make up much more than just the aircraft. It is the tactical planning that the SAC people do before they even commit to a particular target. It is the routing. It is the intelligence information that is available, and it is the crews who can interact and make decisions in the system. And it is the SIOP that establishes the defense suppression effort.

Within the aircraft itself each of these elements adds to the capability to penetrate and, of course, ECM is a vital part of that.

[Slide deleted.]

Now I want to show you this, and I will explain it a little bit because it is difficult to take ECM and reduce it down to a yes or a no or a good or a bad.

What we have done here is, in this bottom block, the longest one, we are really talking about situational awareness. That is the radar warning receiver function, and we have broken that into two segments. The top segment is what SAC refers to as the [deleted].

You can see where some of the systems are in there. The early warning radars are here, some of the guidance and acquisition. The longer ranges are here. And, finally, the high performance fighters, the latest fighters they have, and the SAMs are [deleted].

We will show you in color code what our capabilities are a little later, and the lesser pronounced threats.

[Deleted.]

[Slide deleted.]

Now this next slide you cannot read. The reason we simplified that chart is that there is just too much information. But this will give you an idea. These are all the SAMs that are in these bands, and the aircraft, all those sets that that aircraft has to face. But it

shows you, for instance, that an SA–10 is not only in this band, it is in this band. It is in this band (indicating). So it is very complex, and by using this other chart, as you will see, when we color it in the various colors you have a better idea what our capabilities are.

[Slide deleted.]

Now, what we have released to the field today is called Block 4. [Deleted.]

[Slide deleted.]

If I could show you the next slide, this now is that same chart I showed you before but color-coded in. [Deleted.]

REMAINING OPERATIONAL PRIORITIES

Situational awareness.
Active countermeasures.
Expendables.

Now, SAC indicated to us their priorities to bring this system up. [Deleted.]

POST BLOCK 4.0 FLIGHT-TEST RECOMMENDATIONS

[JULY 1988]

Maximize current ALQ–161 capabilities.
Assess alternative options.

With that in mind, then, the Air Force in July said let us take 90 days, work out where we ought to go with this system. One thing we certainly ought to do is maximize the current ALQ–161 capabilities, and, second, look at any alternatives that will bolster our overall defensive capability for the aircraft.

[Slide deleted.]

These are the things we decided to do to maximize that core program. One is to improve the radar mode determination. This helps us seek out those threats in their search or track mode more clearly, more positively, and define when someone is seeing you in a way that the system can respond better. [Deleted.]

[Additional information provided follows:]

[Deleted.]

[Additional information provided follows:]

[Deleted.]

When we froze the configuration at Mod 0, we did it after ships 2 through 19 were delivered. We are going to bring those up to that same configuration so we are starting at a common plane with all the aircraft. [Deleted] and we are going to ensure a system which self-tests, the defensive system called CITS, the Central Integrated Test System, and that could not be matured earlier because we did not have all the core identified.

In other words, you have to actually develop the system before you can develop the system to test it.

[Slide deleted.]

So when we do that we will have these capabilities. We will be green in all of this capability to receive and have [deleted].

We will also improve that [deleted] because we will fill in this area that had not previously been known that the [deleted], and we will have an improved overall capability for [deleted].

[Slide deleted.]

Now, we also looked at alternative options and these are the series that we looked at. Also, AIL came in and said we can do some things here. [Deleted.] That is a fairly extensive mod, and in the period of time that we have had it we are still looking at the technical risk and the business risk associated with that and what it would really offer for the dollars that AIL has indicated.

Finally, we looked at two ways to augment the ALQ–161. One was to add what they refer to as [deleted]. Another was to actually have a stand-alone radar warning receiver, in other words, take the radar warning receiving function out of the ALQ–161, provide it [deleted].

I can discuss that further if you would like in a moment. We also looked at what would occur if you [deleted].

Finally, we looked at the [deleted]. The system that is being looked at now [deleted].

[Slide deleted.]

General HALL. This is the way we address the risk of each of these—[deleted].

The lowest risk in both categories is, of course, [deleted]. That does not mean there would not be some installation and integration requirements, obviously, because you cannot take something that is designed for a fighter and just pop it in, you have to have the antennas, the power, the cooling and all that. But that is certainly the lowest risk.

[Slide deleted.]

Now, we also addressed this with another chart, and let me explain. We have dollars additive above the currently funded baseline B–1 program along the abcissa and we have probability of survival delta. This is change in the probability of survival. So if you started out in a given SAC scenario with a [deleted] probability of survival, this would increase. You see [deleted]. That is not a percent; on a percent that would actually increase [deleted].

When we looked at it in the current configuration or the analysis was done [deleted] to this level. We drew that line just to show where these other proposed changes would come relative to that.

Mod 1 by AIL came out about the same, and part of Mod 1 could be done underneath correction of deficiencies. Add the wideband receiver, it increases slightly more above that core program, but not a great deal, and costs over $250 million. [Deleted] and would cost in the vicinity of $490 million. If you add [deleted] that I mentioned to that [deleted] you see you get quite a bit of an increase there, and in part, of course, that comes from [deleted].

Finally, there is a break here in the dollars, and I must say that we get into estimating of the first order out here. We do not know exactly where the dollar value would be on the AIL expanded, but we believe, based on what they have told us, it would buy that kind of additional capability. [Deleted] would only buy you that additional capability and we believe would cost in the vicinity of $2.5 billion to $3 billion.

Part of the reason is that you would require [deleted] systems to give the B-1 [deleted].

Finally, we just indicated the [deleted] would be that order of increase in probability of survival, but we have no idea what that cost would be. And I just say that is not only [deleted] in this portion also.

AIR FORCE ROAD MAP

Execute ALQ-161 core program.
Pursue off-the-shelf RWR:
Requires fiscal year 1989 funds for installation study.
Use funds programmed in FYDP.
Scrub AIL's expanded receiver proposal for acceptable risk/cost-effective modifications.
Develop execution plan:
Briefed in 45 days.
Monitor expendable decoy development programs:
Assess for future B-1B applications.
SAC will develop requirement documents to address future B-1B defensive needs.

The last slide that I have, Mr. Chairman, is this one, and it shows that basically our road map is to continue with the core program to get all we can out of the ALQ-161 that we believe is achievable.

The next three bullets really go together. That is, we need to look at pursuing [deleted]. That would require fiscal year 1989 funds to look at how you would install that system in the B-1. We could use the funds that are programmed in the FYDP—there is approximately $500 million there—to work the program. But we should continue to scrub AIL's expanded receiver proposals so we can fully understand what they are capable of achieving technically and what it would cost us and what the schedules would be. And we are doing that at the present time.

Then we need to develop an execution plan and we feel that we would be prepared to brief that in approximately 45 days. We are going to monitor the Navy's program for [deleted] and see how that would work with the B-1. It is currently being looked at, as I mentioned, for fighters, but there is no reason that we can see why it would not be adaptable to a bomber.

Finally, SAC identified the requirements for the defensive system a long time ago. They have been updated to some degree as the threat has changed, but we believe SAC needs to further define those requirements and their defensive needs over the period of time they believe they will use the B-1, certainly through the 1990s, so that we can better tailor our approach with the 161—and the Strategic Air Command is doing that.

Sir, that concludes my briefing on the ALQ-161 and we are prepared to answer your questions.

Senator EXON. General Slinkard, did you have any presentation to make?

[The prepared statement of General Hall follows:]

PREPARED STATEMENT OF GENERAL HALL

Mr. Chairman and members of the committee, thank you for the opportunity to discuss the B-1B program with you. Just two short years ago, almost to the day, the first B-1Bs became operational at Dyess AFB in Texas. We in the Air Force were proud of our accomplishments as those first operational B-1Bs initially entered the

inventory. That sense of pride and accomplishment continues today. During the past two years we have overcome developmental, production and operational challenges in our drive to fulfill the Congressional mandate of deploying B–1Bs within tight fiscal and schedule constraints. A few hurdles remain to successfully conclude the baseline development effort, particularly with the defensive avionics suite; however, the Air Force is in pursuit of solutions to remedy these situations.

In April 1988, the 100th and final B–1B was accepted by the Air Force two months ahead of schedule. The B–1Bs is now operationally deployed at four Strategic Air Command (SAC) bases and is fully integrated into the Single Integrated Operational Plan as our foremost penetrator. The B–1B is a full partner with the other elements of the Strategic TRIAD and the aircraft is doing exactly what we bought it for—deterring nuclear war and forcing the Soviets to deal with us from a position of strength at the ongoing arms control negotiations.

Operationally, the B–1B is maturing on schedule. Planned maturity of the system will be achieved in 1994 when we anticipate reaching the 200,000 flight hours objective. The operational and logistical support of the B–1B, while requiring intense management involvement during this critical maturing process, is rising to meet the challenge. Currently, the B–1B has flown 25,000 operational flight hours in support of aircrew training. This effort has produced 108 fully qualified combat crews as planned. However, logistically, we have some challenges still ahead.

The aircraft availability rates continue on an upward trend. In fiscal year 1987 the rate was 25 percent while the fiscal year 1988 rate increased to 36 percent. While training objectives are being met, the availability of aircraft for operational training is being paced by current retrofit efforts and spare parts deliveries. The major retrofit activity centers on the bird strike vulnerability reduction modification and the flight control retrofit. These retrofit efforts are proceeding according to plan. The bird strike modification effort should be completed in early 1989. Fifty-three aircraft are currently modified. In addition, the first of two flight control modifications, the Stall Inhibitor System (SIS 1) retrofit, is complete and deployed with SAC while, the second modification, the Stability Enhancement Function (SEF) retrofit, is in work; eight SEF aircraft are currently complete. These flight control modifications improve aircraft maneuvering and low altitude range capabilities.

Regarding the spare parts issue, we anticipate improvements in the situation in the near future. The majority of the back orders for spares will be filled in 1989.

Progress on the development front has also been noteworthy. The development challenges of the terrain following the flight control systems are progressing on schedule. The highly publicized terrain following issues of a year ago are now behind us. Recent flight test activity has successfully demonstrated automatic 200 foot terrain following flight in hard ride mode over rugged mountainous terrain at attack speeds. In addition, testing has revealed a significant improvement in the false alarm fly-up rate with current software demonstrating only 1 false alarm every 50 minutes as compared to the goal of 1 per 15 minutes. This improvement is so pronounced that for operational training, flight crews are now artificially inducing fly-up signals to achieve needed training in the recovery maneuver. Regarding the compatibility of the terrain following and defensive avionics systems, laboratory and preliminary flight testing results have been positive and initial precautionary restrictions have been removed. The last significant hurdle in the B–1B baseline development is the defensive avionics challenge.

The latest flight testing of the AN/ALQ–161A revealed a design problem with the receiver/processor precluding the achievement of full operational capabilities without modification to the system. However, the flight test activity also demonstrated that the most operationally significant electronic countermeasures techniques do work. The Air Force notified Congress on 29 June 1988 of the test results from the MOD 1 Block 4.0 laboratory and flight evaluation of the system. In addition, the Air Force directed the contractor, Eaton Corporation, to "stop work" on efforts associated with the Mod 2 configuration, while continuing Mod 1 tasks, as an evaluation was performed of program options by the Air Force Electronic Combat Office (AFECO). This independent assessment of program options by the AFECO team was performed to establish a roadmap for the achievement of operational requirements in light of the recent flight test experience with the AN/ALQ–161A. The team evaluated a number of options to include Eaton's proposal, the addition of a radar warning receiver, the application of towed devices, and other available electronic countermeasures systems. As a result of this study, the Air Force decided to proceed with a "core" program with Eaton while a more detailed technical evaluation was performed on the contractor's corrective action plan. In addition, the Air Force intends to pursue a radar warning receiver effort to remedy the operational requirement for situational awareness. The detailed cost and schedule impacts of the deci-

sions are still in the formulation stage and will be provided to the Congress as part of the 1990 budget request.

In summary, although the defensive avionics flight test results revealed limitations with the system, significant progress has been made on all other fronts with the B-1B program. The current evaluation has identified options to improve key capabilities in the ALQ-161 system. The plan to implement cost effective fixes is in the final formulation stage and will be submitted by the Air Force in the 1990 budget. Thank you.

Senator EXON. Would you care to proceed now, General Slinkard.

STATEMENT OF BRIG. GEN. JOHN D. SLINKARD, USAF, DIRECTOR OF CONTRACTING AND MANUFACTURING POLICY, OFFICE OF THE ASSISTANT SECRETARY OF AIR FORCE (ACQUISITION)

General SLINKARD. It depends upon how you would like to proceed, Mr. Chairman. I understood you earlier to say that we are going to go into the contracting in open session.

I would say that I am prepared to do my best in open session to present the facts with respect to the contracting, as I understand it, in a summary fashion.

What I would like to avoid in open session is things that have to do with the Government's current views and negotiating positions with Eaton, things that have to do with the Government's evaluation or beliefs about how it might proceed with Eaton in the future and things that have to do with, for example, in past negotiations why we were persuaded by this or not persuaded by that.

So I would offer to proceed in whatever fashion you would like to.

Senator EXON. Well, we do want to go into open session later. We would like to get into, among other things, the proposition of how unique is the contract that we have with regard to ECM, particularly with Eaton Co. How does it differ from contracts that we have had in the past, if at all? Does that line of questions trouble you in open session?

General SLINKARD. No, I do not think it does.

Senator EXON. Well, let us just begin the questioning, since we do want to go to open session as quickly as possible. I appreciate your overview on all of this, General Hall. Maybe I will start out by asking if you can tell us what the latest test results have revealed to you about the problems with the B-1 defensive avionics?

I am particularly concerned about how confident you are that at this particular stage you have finally at least identified the problems accurately enough that you can begin to seek remedies to them. Do you think you have a sufficient handle on it?

General HALL. Yes, Mr. Chairman. I believe we do. If I could put back up the chart——

[Slide deleted.]

I believe our confidence really came, Mr. Chairman, in the May-June time period, when we recognized that in order to get the [deleted].

But by breaking that out and breaking it down, we found what the limitations of the system were with respect to the [deleted] and I believe where we have narrowed it down that will satisfy it. And I do want to say when we released Block 4 this was a flight test configuration. It was easy, softwarewise, [deleted] down here. We could have left it in.

I do not believe that had any part in reducing the effectiveness up here, but it was just a software mod, and we will correct that as we showed in the core program, when we can easily bring these [deleted].

But I think with the flight test data we have in hand right now we understand far better the capabilities of the system, and we need to pursue the core program to then bring it up where, as we showed, it would bring much more of this area into the green, and we give the operator options. That is another aspect.

We were pursuing a system that could be [deleted]. The operator, as we heard last week from the guys who are actually operating the system, they have a great deal of capability [deleted]. But certainly in the heat of battle you would like to have [deleted].

Senator EXON. Which of these programs, General Hall, that you have identified—it looks to me like you have gone into it pretty thoroughly—can be fixed under the currently-funded program and which require additional congressional approval for R&D, procurement and testing?

Can any of these problems be fixed under the currently-funded program?

General HALL. The currently-funded program will fund the core program, what we refer to as the 4.1, which will provide that increased capability for the basic ALQ-161. That can be done under the correction of deficiency in the current 20.5 1981 dollar B-1 program.

The other changes, if we add a radar warning receiver, if we go to the expanded receiver that AIL proposed, or the other mods I showed on the probability of survival chart, other changes would require additional funds.

Senator EXON. From what you know now, when can we expect to be presented any detail at all on what needs to be done in the future and what additional funding would be required from whatever sources to complete the job the way it was supposed to operate in the first instance?

General HALL. We are striving to meet a 45-day suspense now with our Air Force Electronic Combat Office to develop an execution plan for the phase that would go beyond the currently-funded program.

Senator EXON. You say in 45 days?

General HALL. Yes, sir.

Senator EXON. You think you would have a handle on all that?

General HALL. Yes, sir.

Senator EXON. Then let me follow that up with getting your view on this new plan that we understand has been advanced by Eaton. If I am getting the right information—and sometimes we get major information through the news sources—for $520 million to $540 million, Eaton has supposedly indicated that they could fix everything up the way it is supposed to work. Is that correct?

General HALL. We are assessing that at this time, Mr. Chairman. That is a part of this 45-day execution plan.

Senator EXON. You will have that in 45 days?

General HALL. Yes, sir, to look at the viability of what AIL is proposing from a technical sense as well as business sense. Can

they do it? Is it achievable, feasible, and do they have the people and capacity?

Senator EXON. Well, since we are in closed session, what is your feeling about that at the present time? Do you think the Eaton proposal has to be looked at? Do you think it has much promise?

I have talked to other Air Force people who are extremely skeptical of anything this company does, given the past experience with them. Can you tell me what your view is?

General HALL. I think, based on what they propose to do, the time that they can do it in, the dollars, that that is a very optimistic projection on their part, and I base that on the progress that they have not made with what we were striving for in the original baseline ALQ-161, which we refer to as Mod 2/Block 5, which would have given SAC all the capability that they needed.

And here they are going to do essentially the same thing but do it a different way. Now, it may well be—I am not an electrical engineer, but it may well be that they have seen the light and that is why we need to look at it. In other words, they may have found a better way to work the processing, to change the architecture to do it within the basic ALQ-161 framework but do it in a different fashion.

And we believe it is worth exploring to determine what the real capabilities are.

Senator EXON. I just think it is critically important. My time is up and I am going to yield to Senator Levin but it just seems to me that we are opening the Air Force and ourselves up to an awful lot of criticism and skepticism if we do not get a handle on this pretty soon. I mean, we have heard everything since this problem first unfolded, primarily as a result of pronouncements and press releases from our friends on the other side of the Hill. They place the fix-up, if it can be done, in the $6 billion, $7 billion, $8 billion range, and then the next thing we hear is that somebody can do it for $540 million, which sounds like a bargain basement price.

That is very attractive, but when all these figures are being thrown out to us and to the general public, it is extremely confusing and I hope we get a handle on this as soon as possible.

Senator Levin.

Senator LEVIN. Thank you, Mr. Chairman.

General, let me start with some basic questions. There are a lot of signals coming in there which we have to sort out on our software. Does the ECM which Eaton has built meet the specifications for ECM for the B-1 bomber?

General HALL. No, it does not with respect to the total capability that SAC required.

Senator LEVIN. So that the performance specs or the performance specifications for the B-1's ECM have not been met?

General HALL. That is correct.

Senator LEVIN. Is that a problem?

General HALL. A problem, yes, in that we are going to continue to push to increase its capability.

Senator LEVIN. You mean get its capability up to where it was supposed to be?

General HALL. Yes.

Senator LEVIN. Is that what you mean by "increase its capability"?

General HALL. Yes.

Senator LEVIN. I do not think we ought to fudge around basically. I mean, we had a commitment from the contractor here, as I understand it, to give us an ECM which meets certain specifications. If it has not done that, we ought to say so. We ought to say what we are going to do to get it to specs and who is going to pay for it. To me, that is the story.

I mean, that is what we have got to be focusing on. There is no use using rhetoric and talking about increasing its capability. Hell, all we want to do is try to get its capability to where it was supposed to be.

General HALL. Yes, sir. I agree.

Let me say, though, from this standpoint that we had never built an integrated defensive system of this complexity before. Now, was there optimism on the part of the contractor and the Air Force that it would be easier to do than it turned out to be? That may well be. But it is not a yes or no. It is not a we have nothing or have it all. We have some capability.

We are trying to determine how hard can we push that and get the most out of it for the dollars that we have expended on the AIL.

General SLINKARD. May I add to that, sir?

Senator LEVIN. Sure.

General SLINKARD. I guess a point I would make with respect to the capability that we originally contracted for and the capability that we are getting at this time and in times past, and who would pay for it is that we know we need to recognize that when we restarted the B-1, when we started the B-1B program, clearly this ECM was the highest risk part of the problem, and both the full-scale development contracts and the production contracts were awarded at the same time.

We took that into account in structuring the contracts on a fixed-price incentive basis in setting up the correction of deficiency or warranty clauses in these contracts, and for that reason we are not in a situation that one might have been in a completely sequential development where you have gone all the way through the development process, made sure that it all worked and worked like it was supposed to, and then were securing a fixed-price promise from the contractor that all the production equipment would be like that and work like that.

So the situation is different from a more sequential program.

Senator LEVIN. Why didn't we use a sequential program, a lesser risk program?

Senator EXON. Senator Levin, just let me say I think maybe you were not here at the beginning. I have no quarrel with your line of questioning. I think it is a very good line of questioning. And I think it would be a line of questioning that would be fully acceptable in open testimony. What we were going to try to do is to use the closed session to get into the things that we could not discuss in the open, and I think the line of questions you are asking is the things we want to get to in open session.

Senator LEVIN. Fine. Let me do what you suggest. I think that is fine.

As I understand the original B-1 penetrability studies upon which the decision was based to buy it, that study said that a fully-operational B-1B would have a [deleted] of successfully penetrating Soviet air defenses in [deleted]. The Institute for Defense Analysis study, the IDA study, which we have seen estimates that the current B-1Bs have a [deleted] chance of penetrating the Soviet defenses [deleted] and, as currently configured it would have a [deleted] chance of penetrating Soviet defenses in [deleted].

Do you agree with the IDA study?

General HALL. In that sense I do not. Let me say where I do agree with the IDA study. The IDA study that shows the increments that you increase that probability of survival or penetration by including changes to the ECM, I agree with those deltas. The absolute numbers, I do not.

And, in fact, CINCSAC indicated that he did not. And it is basically in the input to the analysis or simulation that they run and how they account for [deleted].

But I think the beauty of the IDA study or the strong point of the IDA study is that the increases that are shown correspond very closely to what we show, for instance, for [deleted] and so on. I think those percentages are very close.

Senator LEVIN. My time is up. Could I just follow up that one question?

Senator EXON. Go ahead.

Senator LEVIN. You do not accept those numbers. Would you give us your numbers? What is the current chance of penetrating Soviet defenses as currently configured? What chance would they have of penetrating defenses in [deleted]. If you do not like the [deleted], what are your numbers?

General HALL. Could I get that answer for you for the record? You will not get a single number. You will get a band because it depends on where you target, how you target, and how the bomber is employed. That comes out of the SIOP planning, and that is not within my area. That is the responsibility of the Joint Strategic Target Planning Staff (JSTPS).

[The information referred to follows:]

PENETRATING SOVIET DEFENSES

Today, SIOP planners calculate probability to penetrate to the target(s) based upon [deleted]. For the bulk of the targets, the B-1B's probability to penetrate ranges from [deleted] which for comparable assumptions, are about the same as calculated in the [deleted].

Senator EXON. General Hall, the [deleted] as I understand it, [deleted]. In fact, I think we have known that for some time. When the B-1 was originally ordered, was it assumed that the [deleted] would work under all conditions or has a change been made along the way?

General HALL. I do not think there was any question about [deleted].

Senator EXON. What about [deleted].

General HALL. [Deleted] it is my belief, and the Institute for Defense Analysis [deleted].

Senator EXON. But it is back to Senator Levin's question that I do not think we want to get into in open session. Was [deleted] one of the failures of the B–1 and has that been one of the disappointments that we are having difficulty with?

General HALL. No, I do not think it is a disappointment at all. I think that the system works. [Deleted.]

Senator EXON. You do not know whether it works or not [deleted].

General HALL. I believe it does work. [Deleted.]

Senator EXON. Let me get into something that is highly classified, and that is the IDA study. What is the Air Force's position with regard to the IDA study and what percentage of the IDA study do you, representing the Air Force, believe is accurate, or do you accept it all as accurate?

General HALL. Mr. Chairman, those aspects of the IDA study that show the incremental improvement by changes in the ECM system—that is, [deleted]—I think those are good, valid indications of the increased capability.

What we disagree with, as I mentioned earlier, is the overall probability of survival that is indicated in that [deleted].

Senator EXON. General, is there a shortcoming with the IDA study, in your view, that does not take into consideration [deleted].

General HALL. Yes, sir, Mr. Chairman. The indication [deleted].

Senator EXON. General, what is the Defense Science Board role in evaluating the avionics system of the B–1? What is the status of the Board's investigation that I understand is going on, and has the Board arrived at any conclusions or preliminary conclusions in this area?

General HALL. Mr. Chairman, I will have to provide that for the record. The only briefing that I saw by the Defense Science Board was not a report but rather just a verbal discussion by the head of the Defense Science Board. I have not seen their report on the B–1 ECM system.

Senator EXON. Senator Levin, further questions?

Senator LEVIN. Yes.

Can you give us the penetration capability of the most modern version of the B–52 and the percentage expected to survive?

General HALL. No, I cannot, other than I would certainly say, based on what we briefed earlier, the attributes which contribute to the penetration capability of the B–1, one can say that the B–52 would not have an equivalent capability.

Senator LEVIN. But can you give us in terms of the percentage expected to survive? Doesn't the Air Force have that number?

General HALL. Senator, the way they would have it is a band, depending on the targets you go against, the effect of the SIOP laydown, the target routing that is used, and a whole series of other inputs. And, based on your other question, sir, I will see if we can find an answer.

[The information referred to follows:]

DEFENSE SCIENCE BOARD

The Defense Science Board has been tasked by the Under Secretary of Defense for Strategic and Theater Nuclear Forces to evaluate the defensive avionics system of the B–1B. They have not issued a report on their evaluation to date. The head of the

Defense Science Board stated during verbal discussions with the Air Force, that the Defense Science Board generally agreed with the Air Force assessment of the defensive avionics system and their recommended course of action.

Senator LEVIN. Are you able to give us the level of survivability which is required for the B-1B?

General HALL. No, but I will say that the way the planners work it is they plan a mission, and if it comes out to a level that is not acceptable to them, then they will alter those variables that I showed you. That is, they will change the route or they will change the laydown defense suppression, or they will change other attributes or aspects of how the bomber is employed so that they achieve an acceptable probability of survival.

Senator LEVIN. Does the B-1B now meet an acceptable level of survivability?

General HALL. Yes.

Senator LEVIN. It does not have to be fixed?

General HALL. It does today.

Senator LEVIN. So it does not need a fix?

General HALL. [Deleted.]

[Additional information provided follows:]

[Deleted.]

Senator LEVIN. So it meets the current threat, the ECM meets the current threat adequately?

General HALL. [Deleted.]

[Additional information provided follows:]

[Deleted.]

Senator LEVIN. That is the official Air Force position?

General HALL. Yes, sir.

Senator LEVIN. And the projected threat, the [deleted] threat, does it meet that adequately?

General HALL. That I cannot answer for you. As it is configured today, I cannot answer that.

Senator LEVIN. That is my question. As currently configured, does it meet the expected [deleted] threat?

General HALL. I will get an answer for you on that, sir.

Senator LEVIN. You do not have an opinion to answer that question?

General HALL. [Deleted.]

[The information referred to follows:]

PROJECTED THREAT

The Air Force believes that the B-1B's probability-to-penetrate, as configured today, [deleted]. These systems are quality improvements in a systematic replacement of older systems.

Senator LEVIN. Do you know the difference in assumptions that you make and that IDA makes that leads you to different conclusions?

General HALL. They used in fact a simulation that we used to derive these numbers is one of the simulations they used, but I think they used three altogether and they, as I indicated earlier, use [deleted].

Senator LEVIN. Can you stop right there? Is that a percentage [deleted] number?

General HALL. Yes, it is.

Senator LEVIN. Is the difference that IDA assumed [deleted].

General HALL. Let me see if I have an answer for you on the [deleted].

[Pause.]

General HALL. Yes, sir. We believe it is [deleted].

Senator LEVIN. Does that assume a "bolt out of the blue" attack?

General HALL. [Deleted.]

Senator LEVIN. [Deleted.]

General HALL. That is correct.

Senator LEVIN. [Deleted.]

General HALL. That is correct.

Senator LEVIN. And if we [deleted] then what happens to your numbers?

General HALL. Well, I think [deleted]. It would change the number, sir. I do not know how it would change it.

Senator LEVIN. Just so long as we are really clear on that at least, IDA's assumption number one that you disagree with is that it assumes that you may have to respond to a [deleted], and the Air Force study, which differs, or your answer, which differs from IDA, assumes that there was [deleted]. Is that fair enough?

General HALL. Sir, I am not sure IDA is [deleted] also. That is the difference.

Senator LEVIN. You mean the [deleted].

General HALL. Yes, sir.

Senator LEVIN. It uses a [deleted]. What is the difference in that assumption? You said one was an assumption based on [deleted].

General HALL. We believe, based on [deleted] than the IDA study gave credit for.

Senator LEVIN. Give us the differences, then. If you both assume [deleted], why would there be a difference?

General HALL. I will have to get an answer for you for the record on that.

[The information referred to follows:]

GENERATED ALERT

Both the 1986 Air Force Bomber Study and the Institute for Defense Analysis (IDA) assessment of the B-1B's capability assumed [deleted]. This is the main difference between the Air Force study and the IDA assessment.

Senator LEVIN. You have indicated that in your opinion the ECM meets the [deleted]. What is the problem? There is a problem with ECM that you have acknowledged. What is the problem in meeting the threat as projected up to [deleted].

General HALL. [Deleted.]

Senator LEVIN. Is that not part of the threat?

General HALL. Yes, sir.

Senator LEVIN. So when you say it meets the threat, I do not understand your answer.

General HALL. Well, you can meet the threat in the sense that you can satisfactorily penetrate and deliver your weapons [deleted].

Senator LEVIN. You said in [deleted] it was adequately meeting the projected threat for [deleted]. Is that your opinion, the Air Force opinion?

General HALL. That is my opinion.

Senator LEVIN. Is that the Air Force opinion?

General HALL. I do not know if it has been expressed that way, but we believe it will be able to penetrate through the 1990s if we can do the things we have outlined to the ALQ-161.

Senator LEVIN. Do what?

General HALL. If we can do the things we have outlined here.

Senator LEVIN. Oh, I said [deleted] meet the threat.

General HALL. [Deleted.]

Senator LEVIN. Without those changes?

General HALL. With the core program that we are doing under the baseline under the currently-funded program.

Do I believe we need to enhance the ECM? Absolutely.

Senator LEVIN. And meet the specs?

General HALL. Yes, sir.

Senator LEVIN. You would like to meet those specs?

General HALL. Yes, sir.

Senator LEVIN. But we did not meet those specs. My time is up.

Senator EXON. Thank you, Senator Levin. We want to go to open session. I have one more question in closed session, but I think Senator Nunn may have some questions. Senator Nunn.

Senator NUNN. Mr. Chairman, you probably have already covered my questions. I will catch up. I do not want to go through a duplication here, so why don't you go ahead with your schedule?

Senator EXON. I just have one last question, and then we will undoubtedly, General Hall, have some other questions for the record that we may submit to you, and we would appreciate your response in prompt fashion.

Among the other alternatives that I understand have been looked at is a proposal, I think from ITT and Rockwell, that we augment the ALQ-161 with the ALQ-172 currently in service on the B-52. What would you think of that proposal and do you view that as a viable option?

General HALL. No, Mr. Chairman, we do not. If I could have one of those charts again I think I can graphically show it better.

Senator EXON. In other words, you think that is not something we should pursue? You have taken a close look at it and you have discarded it; is that right?

General HALL. Yes, sir, on three counts. One, it does not [deleted] where we need to improve the system. Two, the cost, because you would have to [deleted] the B-1 in order to give it the coverage that they achieve [deleted]. It requires [deleted] that has been looked at.

And, third, the [deleted].

Senator EXON. Inside that band?

General HALL. [Deleted.] And therefore, in order to have the radar warning and receiving capability that we need we would have to add that as well, and that drives the cost very high.

Senator EXON. Probably you have not got room for it either, have you?

General HALL. I believe that room could be made. I do not think that is the prime consideration. It is cost and capability that are drivers.

Senator EXON. I have no further questions. Do either of my colleagues have any further questions.

Senator LEVIN. Could I just ask one on that chart?

Senator EXON. Yes.

Senator LEVIN. Now that chart would all have to be green or blue, as I understand it, if performance specs were met.

General HALL. Green to meet the performance specs. We indicated blue on it, that that was something that was not even included in the specs, the threat change, and we are increasing the capability beyond the original spec to meet that threat change.

Senator LEVIN. It would all have to be green for the specs to be met?

General HALL. Yes, sir.

Senator LEVIN. And the specs, I take it, were set forth with good reason?

General HALL. Yes, sir, understanding the threat.

Senator LEVIN. And it is based on those specs?

General HALL. Yes, sir.

Senator LEVIN. So at least we could say the specs have not been met?

General HALL. All the specs have not been met, yes, sir.

Senator LEVIN. Thanks.

Senator EXON. Thank you, gentlemen. I think now staff will be advised we are going into open session, and I have a short opening statement as well as statements by my colleagues.

[Whereupon, at 11:10 a.m., the subcommittee recessed, to reconvene immediately in public session.]

OPEN SESSION

The subcommittee met, pursuant to recess, at 11:11 a.m., in room SR-232A, Russell Senate Office Building, Senator J. James Exon (chairman) presiding.

Present: Senators Exon, Nunn, Levin, and Warner.

Staff present: Robert F. Bott, Brian D. Dailey, Sherri Wasserman Goodman, Ronald P. Kelly, and T. Kirk McConnell, professional staff members; Mickie Jan Wise, staff assistant.

Also present: Jeffrey B. Subko, assistant to Senator Exon; Gregory J. Weaver and Elise J. Bean, assistants to Senator Levin; William J. Lynn, assistant to Senator Kennedy; Charles C. Smith, assistant to Senator Dixon; and Milton D. Beach, assistant to Senator Glenn.

OPENING STATEMENT OF SENATOR J. JAMES EXON, CHAIRMAN

Senator EXON. We will now reconvene in open session. The subcommittee will now go into open session.

The closed session just concluded was very informative and most useful. In this open session we may have to turn over again some of the ground that we just plowed, but it is important to get some of this information explicitly in the public record.

This open session also provides an opportunity to examine contracting relationships and responsibilities between the Air Force and the Eaton Corp., which builds the ALQ-161 defensive avionics system for the B-1 bomber. With us again from the closed session is Maj. Gen. Mike Hall, Director of Strategic and Special Operations Forces and Airlift Programs, and Brig. Gen. John Slinkard, Director of Contracting and Manufacturing Policy.

I would ask are there any opening statements by any of my colleagues for the open session?

Senator NUNN. I do not have anything, Mr. Chairman.

Senator EXON. Senator Levin.

Senator LEVIN. Mr. Chairman, there are two questions in open hearing that I hope we can get answered, particularly in combination with the executive session that we have just had.

One is, can we fix the disturbing technical problems that affect the electronic countermeasures system in the B–1B bomber, and, if we can, who is going to pay for the repairs.

In April 1988, as I understand it, the Air Force and Eaton entered into a global restructuring agreement which modified the original ECM contract. This agreement downgraded the original performance specifications for the ECM, apparently because the Soviet threat did not materialize as predicted.

Second, under this agreement certain new work was to be done. Third, it listed known deficiencies in the ECM system and restructured the payment terms under the COD provisions in the original contract. Essentially it stated that the United States would pay 80 percent of the first $75 million in repair work, and 100 percent of the repair work after that, up to a ceiling of $400 million. Above the ceiling, Eaton would be 100 percent responsible for all those costs.

Under this global restructuring agreement, there was finally a ceiling put on U.S. liability and taxpayer liability for the repair cost. That was a step forward. But, of course, even under that agreement the taxpayers were out about $500 million in repairs, and the question is why. Is it fair to make the Treasury pay for these costs instead of Eaton?

Now the global restructure agreement that I refer to was signed just before the major overload problem was discovered in June in the ECM system, so another important matter to be discussed today is whether the agreement, that global restructure agreement, requires Eaton rather than the United States to pay for fixing this overload problem that was discovered subsequently to the global agreement's signing in June.

If it does, if Eaton is required under that agreement to fix this overload problem, we have to then find out whether the Air Force is going to hold Eaton to its obligations or whether, as rumor has it, the Air Force is going to let Eaton off the hook financially, with the result that another repair bill for ECM will have to be paid by the taxpayers.

So the basic issue is, can we fix the ECM. If so, at what cost, by what deadline, and will the contractor or the taxpayers be asked to pay for the fix?

I would ask that the balance of my statement be inserted in the record.

[The prepared statement of Senator Levin follows:]

PREPARED STATEMENT OF SENATOR CARL LEVIN

There are two questions I would like answered by the end of this hearing: can we fix the disturbing technical problems affecting the electronic countermeasures system in the B–1B Bomber and, if we can, who will pay for the repairs?

The purpose of the electronic countermeasures or ECM system is to receive electronic signals surrounding the B-1B Bomber, to identify them, and to jam those that represent a threat. Of the B-1B Bomber's original budget of $20.5 billion, approximately $3 billion was allocated to this task. It is a key defensive system, which is designed to assure the plane's ability to penetrate Soviet air space. Without it, the plane has a significantly lower penetration capability.

In 1981, Eaton Corporation was selected to build the ECM for the B-1B Bomber. Eaton has since delivered all 100 ECMs promised, but not one of them meets the original performance requirements for the system. In fact, at this moment—more than 5 years after work has begun—the ECM systems in the B-1B Bombers do not meet even the downgraded performance requirements that were established in April 1988.

Instead of performance, the ECM has compiled a history of design and production problems. These problems have involved such diverse elements of the system as the antennas, Tail Warning Function System, and Preprocessor Avionics Control Unit, as well as other hardware and software components. There have also been problems integrating the ECM with other components of the B-1B Bomber, producing spare parts, performing tests, and other matters. The cost to repair these known deficiencies appears to be around one-half of a billion dollars.

And the story gets worse. About 3 months ago, in June 1988, results were released from the latest round of flight tests involving the ECM system. These test results revealed that, in addition to the deficiencies already identified, the ECM system has an inherent, architectural flaw which causes the system to overload and shut down in certain situations. This design problem, apparently unsuspected despite years of development and hundreds of millions of dollars, threatens the effectiveness of the entire ECM system and thus of the B-1B's ability to penetrate Soviet air Space.

The extent to which the ECM's overload problem can be corrected, and the cost and time involved, are matters which I hope will be discussed today. The latest estimates I've seen are that it will cost an additional $300 million to $3 billion in new money, depending upon the repair option chosen. That cost threatens to bust the budget of the B-1B Bomber. I've also been told that the earliest the repairs can be completed is 1992. That's about the same time the Stealth bomber is scheduled for deployment.

In short, we are facing another 4 years, in which hundreds of millions if not billions more dollars will be spent to correct the flaws in the ECM system. Which brings me to the next question.

Who is supposed to pay for all the repairs to the ECM? About eight months ago, General Randolph told us that Eaton had "signed up to deliver the [ECM] system at specified numbers" and that "the contractor is responsible for doing the things he needs to do," including bringing the ECM up to specifications. Indeed, a contractor who builds a deficient system is usually required to correct the deficiencies at no extra cost to the government.

However, normal contracting principles apparently were not used in the ECM contract. In fact, to date, Eaton has not been held liable for all or even most of the repairs to the ECM. Instead, the American taxpayer has been asked to foot the bill. That is a troubling proposition, not only for this procurement but for others, and it is an issue that merits more attention than it has received so far in the debate over the B-1B Bomber.

To understand what has happened and the context of the contracting decisions, a brief overview of the program may help. In 1981, Cap Weinberger told the Congress that DOD could deliver the B-1B Bomber by the end of 1986 for a total cost of $20.5 billion. He convinced the Congress to fund the program by arguing that Soviet air defenses were improving at such a rate that the B-52 would lose the ability to penetrate Soviet air space before the Stealth Bomber was ready for deployment. He said that meant there would be a gap—from late 1986 to the early 1990s—in our ability to penetrate Soviet air space with a manned bomber. He argued that the B-1B Bomber was needed to fill that gap.

When Mr. Weinberger made these arguments, some of us spoke out in opposition. We questioned whether the B-52's capability would degrade so quickly, whether DOD could deploy a new bomber by 1986 (just 5 years away) to fill the alleged gap, and whether, even if DOD could do it, the solution was too expensive in light of other options available. Mr. Weinberger prevailed in the debate, and, on the strength of his sales pitch, Congress decided to fund the program.

It was in that context that the B-1B Bomber began—facing a 5-year deadline and specified budget. To meet these politically driven time and budgetary constraints, the Air Force deviated from normal contracting procedures and took several risks and made several contracting decisions that need to be examined.

One such step was the Air Force's decision to issue concurrent contracts for several key components of the B-1B Bomber, including the ECM. Concurrent contracts mean the Air Force simultaneously issues two contracts to a single contractor: one to complete developing the component and the other to begin producing it while development is ongoing. The normal procedure is to complete development first, and only then to go into production. Under concurrency, the contractor starts producing an item that is still being developed.

The risks in concurrency affect both the government and the contractor. Design mistakes are nearly inevitable and may require developing alternative components, retrofitting production lines, or correcting defective products. Reliable cost estimates may be impossible due to a lack of data. Production deadlines can quickly slip.

Given these risks and uncertainties, why use concurrent contracts instead of the normal development and production contracts? The justification was that concurrency is faster, and if the B-1B Bomber was to meet its deadline and fill the alleged penetration gap, speed was of the essence.

Because of the risks entailed in producing an ECM system at the same time it was being developed, the Air Force agreed to share the costs that would be incurred to correct deficiencies. In the development contract, Eaton promised to correct all design defects without added cost to the government; in the production contract, the US promised to pay for most of the retrofit costs incurred to implement design corrections—in fact, the US agreed to pay 80% of the first $75.4 million in repairs and 100% of the repairs after that. These agreements were set forth in a "Correction of Deficiency" or "COD" provision in each contract.

These COD provisions turned out to be expensive for the government. The large number of design defects in the ECM system, together with high retrofit costs, has already caused hundreds of millions of dollars in repair costs to accumulate, chargeable to the American taxpayer. No ceiling was placed on these costs, which meant the contractor had little incentive to hold them down. In addition, it meant that the American taxpayer had assumed an theoretically unlimited liability for repairs. Further, problems with the wording of the COD provisions led to disputes over whether the US had to pay Eaton not only the costs of the repair work, but also a fixed fee for profit. Another dispute arose over whether certain design deficiencies could be charged at the US' expense under the production contract instead of Eaton's expense under the development contract.

Questions need to be asked about the poor wording of these COD provisions and about how they were implemented. This is important especially for future procurements. Why wasn't a ceiling placed on the COD costs chargeable to the US? What contract language led Eaton to believe it was entitled to earn profit on COD work over the $75 million cap in the production contract? Why were design deficiencies chargeable to the US under the production contract? These matters are complicated and can't be explored in detail at this hearing. But these problems can and should be avoided in the future, either by limiting use of concurrent contracts or re-wording the COD provisions and implementing them in a more careful manner.

What happened here is that, in April 1988, the Air Force and Eaton entered into a "global restructure" agreement which modified the original contracts. First, it downgraded the original performance specifications for the ECM, apparently because the Soviet threat had not materialized as predicted. Second, it ordered certain new work to be done. Third, it listed all known deficiencies in the ECM system and restructured the payment terms under the COD provisions in the original contracts. Essentially, it stated that the US would pay 80% of the first $75 million in COD work and 100% of the COD work after that up to a ceiling of $400 million. Above the ceiling, Eaton would be 100% responsible for all COD costs.

The "global restructure agreement" finally put a ceiling on US liability for COD costs. That was a step forward. But it also hit the taxpayer for almost one-half of a billion dollars in repairs. Why? The issue is whether it is fair to make the taxpayer pay these costs instead of Eaton. Does the Air Force intend to make similar contracting decisions in the future?

The global restructure agreement was signed just before the overload problem in the ECM system was discovered in June. Another important matter to be discussed today is whether this agreement requires Eaton—rather than the US—to pay for fixing that problem. And if it does, we must find out whether the Air Force is going to hold Eaton to its obligations or whether, as rumor has it, the Air Force is going to let Eaton off the hook financially only to slap the American taxpayer with another gargantuan repair bill for the ECM.

When the B-1B Bomber was first proposed, some of us predicted that it would be a waste of valuable time and money. But the purpose of this hearing is not to re-

argue the merits of the B-1B Bomber. Those are the issues of yesterday. The decisions were made and we have to live with the consequences.

The issues today are whether the many problems affecting the B-1B Bomber can be fixed and, if so, at what cost and by what deadline. Most important, will the contractor or the United States taxpayer be asked to pay for the repair bill?

So far the thing the B1 bomber best penetrates is our pocketbooks. That's a raid on taxpayer dollars that has got to stop.

Senator EXON. Thank you, Senator Levin.

We will now begin the general questioning. General Hall, to try and set the stage and start out from the beginning, I would like to give you an opportunity, as briefly as you possibly can, to state for the record here in open session what the problem is as you and the Air Force see it, and how close you are to having a full understanding of how we should proceed from here.

In closed session you indicated you were probably going to have some of these answers specifically in 45 days, but generally would you just set the stage right now as to how serious the problem is and what the Air Force can recommend now or is likely to recommend within the next 45 days to address it? Then we will go into some more of the details.

General HALL. OK, Mr. Chairman. As you know, this spring in testing we found the system did not measure up to the capabilities that we had expected. It does have what I will refer to in open session as a limited capability. It has a capability against SAC's most pressing concerns with respect to the threat.

We want to get the maximum out of that system that we can, and we are on a course to do that now, where we are pushing with the contractor to achieve everything that we believe is achievable out of the 161. At the same time, in order to ensure that we provide the Strategic Air Command with the full capability they need, we are looking at options.

Two of those options have been put forward by the contractor, AIL. There are other options which we and the Air Force, through a new organization called the Air Force Electronic Combat Office, have put together, which would provide alternatives to increase the capability of the 161—in other words, add to the 161. And we are looking at other systems that were not available when the 161 was designed.

So collectively we are putting that together. We will pursue driving the 161 to its maximum capability, and within 45 days we will have assessed what AIL's offers are, and we will look at those with respect to cost, schedule and performance additions, as well as those that have come up as alternatives, if I can use that term, that are other than AIL's proposals.

And again within 45 days we hope to have an execution plan put together to gain the most for the defensive system overall.

Senator EXON. General, thank you. Let me ask you a leading question or two that will be followed by a statement, because all too often only one side of the story is told.

The B-1B is a fully-operable bomber today. It is fully capable of carrying out every mission that is assigned to it as of today. It is a penetrator as of today. You believe that it will be a penetrator well into the 1992 period and beyond; that is your personal opinion.

So this bomber is not a bomb, as has been prominently portrayed in the news media. The shortcomings—what is going on here? I

think we were getting along fine before you moved the microphones.

Senator LEVIN. It's ECM, Mr. Chairman. [Laughter.]

Senator EXON. The ECM is finally working. I will talk a little louder so we will not have to worry about that.

The crews that you have indicate that they are extremely happy with the performance of this bomber; that it is far, far superior to the B-52, and, as was brought out in a meeting that we had about 1 year ago with B-1B pilots, the crews like the plane. I am not violating anything by saying this—that the only disappointment that the Air Force has today with this airplane is the defensive electronic countermeasures. As you said in your opening statement, the ECM capability has not met what was anticipated or contracted for. Is that a fair summation of you position?

General HALL. Yes, sir, that is correct. I might carry it a step further in saying that the B-1B is an effective penetrator today. We believe it will be tomorrow and it will be into the future.

In the closed session I indicated a date through which I felt the B-1B would be an effective penetrator. I just would like to make clear in the open session we believe it will be a penetrator through the 1990s. Obviously there are some things that we want to do to the ECM to make sure that occurs.

Senator EXON. Let us go to you, General Slinkard. You certainly know that there are many of us—and I am sure that you will be asked further questions on this—who do not understand why, if the contractor has not lived up to what that contractor promised to do, why it should cost the American taxpayer more money to do what Eaton has not done.

There will be follow-up questions, but I want to get a general statement from you at the beginning as to why this Eaton contract appears on its surface to be significantly unique in the way it was drawn with regard to the caps and the ceilings that are placed on it.

It would appear that this Eaton contract is somewhat unique in that it has created a situation in which Eaton Corp. would be better off if and when they got to the cap because by that time they essentially would have a blank taxpayers' check to go ahead and fix this thing if they could not do it right in the first place under the original contract.

General SLINKARD. I would like, if I could, Mr. Chairman, to talk about the contract itself and where it started and how it progressed, if I may have a few minutes to do that.

In the case of not only the Eaton contract but also the Rockwell contract and the Boeing contract these contracts were awarded for the simultaneous full-scale development and production in May 1982. These were fixed-price, incentive, firm contracts for both development and production.

It is important to recognize that the early production hardware was in fact the development hardware. That is, we did not buy, in the case of Eaton, separate development hardware. At that time, these contracts were structured as fixed-price, incentive contracts with what is called an 80/20 share ratio, meaning that for costs above the target the Government would pay 80 percent and the contractor would pay 20 percent, up to the ceiling price of the con-

tract, at which point the contractor would be responsible for all costs over ceiling.

The development contract, when it was awarded in 1982, had a target price of $198.9 million and a ceiling price of $234.2 million. Currently, the full-scale development contract target price is approximately $209 million, but that amount does not include the global restructure change issued in April 1988 that Senator Levin mentioned. I will talk about the global restructure in a few moments.

The initial production contract included eight ship sets as well as long-lead, nonrecurring engineering, installation and checkout, data and so forth. It was the same type of contract and it had a target price of $143.2 million and a ceiling price of $171.1 million. It now has a target price of $2.6 billion and a ceiling price which does not include global restructure. These increases are not because of cost growth; it is primarily because we added production lots 3, 4, and 5 for the remaining 92 ship sets and made a series of other changes as we went along.

I would like to point out that the terms and conditions in these contracts were fully in accord with law and regulation, and that in the case of the multiyear buy for lots 3, 4, and 5, under the production contract the correction of deficiencies clause was changed to conform with title 10 U.S.C., section 2403 pertaining to contractor guarantor of warranties.

The correction of deficiency provision in the case of the full-scale development contract authorizes the contracting officer to direct the contractor to correct any and all deficiencies. Cost of doing that are allowable under the contract, and that means it goes on that share line that I talked about.

The COD provision contained in the production contract also authorizes the contracting officer to direct the contractor to correct deficiencies other than those for producing and retrofitting. For production and retrofit there was a correction of deficiency cap of approximately $75 million. What that meant was that we would be on an 80/20 share line up to the $75 million, and thereafter the Government would pay for additional correction of deficiencies on a 100 percent cost reimbursement basis. Similar cap arrangements were used in the Rockwell contract and in the Boeing contract.

Now, where those contractors were able to perform as expected those arrangements worked well. I would point out that those warranty arrangements I believe were in accord with section 2403. When you go back and look at both the language of the law and the committee reports at that time, the Congress was greatly concerned that we not ask for warranties that were not cost effective, nor ask for absolutely open-ended, unlimited liability of the contractors, and thereby pay more than we should for that arrangement.

It is, however, to try to be directly responsive, those two arrangements—the idea of the share line and the idea of the cap—that caused there not to be a situation where we can just press the contractor to correct everything and have it cost us no more, because it does cost us more as the contractor expends money to carry out these corrections.

If I could, sir, I would like to mention how we got to what is now called the global restructure as briefly as I can. In about the September 1986 timeframe, the contracting officer issued a very broad notice of deficiencies to Eaton on the development contract because Eaton had not in fact developed the system as required at that time. They were also producing the system in a variety of configurations at that time, as improvements were made.

The Air Force decided in the fall of 1986 that in order to avoid delaying the air frame contract and in order to meet our operational commitment, and in order to put a system in the field that was maintainable, we needed an interim baseline, and that baseline came to be called Mod 0.

Now the word "mod" tends to be confusing because that sounds like we are changing something which we are not. These were really steps on the way to what we were supposed to be doing in the first place. At that same time, a Mod 1 and a Mod 2 were planned.[1] The Mod 0 configuration was incorporated into ship sets 38-on. We retrofitted ship sets 20 through 37 at a cost of about $4 million against the $75 million COD cap.

In that same timeframe, beginning in November 1986 and continuing through 1987, it is fair to say Eaton and the Air Force had continuing disagreements about Eaton's capability to identify and fix the problems associated with the AN/ALQ 161 and their duty to undertake an evaluation of this Mod 0 configuration to determine how it was performing and what else needed to be done.

There were also some business disagreements between the Government and Eaton. For example, there were disagreements about whether they were to receive profit on those reimbursements above the cap. There were important disagreements about under which contracts the development contract or the production contract, certain design deficiencies should be charged and which work was in fact new work, because the Air Force did make some changes as we went along, versus correction of deficiency work.

In the summer of 1987 the contracting officer concluded, after considerable attempts to agree on these issues on an issue by issue basis, that the best way to move ahead with the program and do those things that needed to be done and resolve the issues was to combine these issues into a single settlement. That is what led us to the so-called global settlement.

In that global restructure, the full-scale development contract has a not-to-exceed increase of $70 million in the target price, and $74 million in the ceiling price. The reason I use that peculiar terminology is that we have not yet negotiated the amount that will actually be added to the target price and the ceiling price. We have struck a deal with the contractor that says when we get done negotiating it will be no more than those amounts. The same is true under the production contract, where the target price not-to-exceed increase is $476 million and the ceiling price not-to-exceed increase is $482 million.

In addition, the Government obtained the right to $23 million in work to be performed without charge to this or any other Govern-

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[1] MOD 1 was for software update to work with the MOD 0 hardware. MOD 2 was for the COD work to achieve original contract requirements.

ment contract and deleted the requirement to pay on a cost reimbursement basis for correction of deficiencies over the cap. Of the $476 million NTE for the production contract, $393 million is estimated for correcting deficiencies which previously would have been done under the correction of deficiencies, with the Government paying dollar-for-dollar, and putting that on the share line to give Eaton some incentive to perform that work at a lower price and be able to, one, anticipate some profit if they did it for a lower price, and, two, take part of the hit and absorb the loss if they did it for a higher price.

Subsequent to the issuance of this global settlement, as General Hall has said, there was a partial stop work order that came out of the findings from the flight test. Essentially that stop work order allows Eaton to continue to work as those things that are necessary in any event while the Air Force pursues the ultimate outcome. The stop work order was recently extended to January 1989 to give us a chance to put the pieces together.

It is clear that once the programmatic decisions are made, the decisions that we have discussed earlier both in open session and closed session, this existing contractual arrangement, which you can recognize is in an unstable state at this point because it is not fully negotiated, will have to be changed again. We will be involved in some tough and complex negotiations with Eaton to sort everything out, lift the stop work order, or otherwise change it, and negotiate within those not-to-exceeds, plus any other further changes that we make, a fair and reasonable price that places an appropriate degree of risk on both the parties.

I apologize for that being so long, but I think that further questions will be better understood in some kind of context.

Senator EXON. Thank you, General.

I am pleased to recognize Senator Levin.

Senator LEVIN. Thank you, Mr. Chairman.

General Hall, let me just ask you some basic questions here. First of all, does the ECM on the B-1 meet the performance specifications required?

General HALL. The B-1 ECM today does not. That is what we are working toward, to improve that capability toward those specifications.

Senator EXON. So the answer to the question is it does not?

General HALL. Yes.

Senator LEVIN. And would you agree that therefore the penetration capability of the B-1 is less than was specified because of the shortfalls in the ECM?

General HALL. No. Let me phrase it this way, because I do not want to get into classified, but the mission planners know what the capability is and they know what the threat is, and they are able to develop the profiles so that it is a satisfactory level of penetration capability.

Senator LEVIN. So that means the missions have been modified because of the capabilities are less?

General HALL. Yes.

Senator LEVIN. Now, the fact that the ECM does not meet the performance specifications in that contract, which you acknowledge is a fact, is that correct?

General HALL. Yes.

Senator LEVIN. Is it a problem?

General HALL. It is not a problem right now because the limited capability we have addresses the threats that are of greatest concern to SAC.

Senator LEVIN. Do we care whether or not it meets the specs?

General HALL. We care in two areas, yes, sir, because, one, we want to achieve the overall capability which allows us the full flexibility to employ the system, and, two, we want to gain the maximum for the money that we have spent on the ECM system.

Senator LEVIN. General, cutting through the packaging, does the fact that the ECM does not meet the specs constitute a problem?

General HALL. I had hoped that I had put that in the proper perspective, that if you can handle what are the more critical threats—in other words, there is a degree of concern depending on the threats that you are presented with.

Senator LEVIN. I will get to the degree of concern in a minute. But it is a problem. I mean, won't we even acknowledge that much, that that represents a problem?

General HALL. Yes.

Senator EXON. I guess in layman's terms what we are getting at, if I ordered an automobile with bulletproof windows for a reason that I thought it was necessary and the car arrived without bulletproof windows, I think I would have a problem. Is that not kind of what you are getting at?

Senator LEVIN. It still performs the function of a windshield. You can still see through it, and you may never be shot at so 95 percent of the time you are in good shape. But the 5 percent of the time you think you might be shot at, you are in lousy shape.

Now you can change the route of the automobile so you go into a different city or some places where there are no guns, but if you ordered it there in an automobile, as the chairman says, with certain specs for the windshield to be bulletproof and you do not get it, it is a problem, is it not?

General HALL. Yes, sir.

Senator LEVIN. Why don't we just acknowledge that much? You have, and we are grateful for that.

Now, how much is it going to cost to meet the specs, the performance specs? How much is it going to cost us more to meet those specs?

General HALL. Sir, as we discussed in the closed session, there are a number of changes that we are looking at at this time, and they range from within the correction of deficiencies all the way up to higher numbers that are not really defined yet because we have not had a chance to thoroughly explore, for instance, one of AIL's options.

Senator LEVIN. My question was, how much will it cost us to get the performance specs? That is my question.

General HALL. I do not have that answer for you.

Senator LEVIN. Can you give us a range? Is it fair to say it will cost us somewhere between $300 million and $3 billion?

General HALL. Yes, within that range.

Senator LEVIN. Now, who is going to pay that?

General HALL. The taxpayers. The Government will have to pay for some of it if we cannot achieve that capability with AIL.

Senator LEVIN. Isn't it fair to say that the taxpayers are going to pay a significant portion of that?

General HALL. Yes, sir.

Senator LEVIN. Why should we pay any of it if we had performance specifications it was supposed to meet and it is not meeting them?

General HALL. The best way I can think to phrase it is that the contractor produced a part of that capability. He could not produce it all. And the question that we are trying to work with him is, is he capable of producing all that spec capability. In fact, since no one has done it before, is anyone capable of producing all of it?

That is what we are working so hard in this current study to come to grips with, through this Air Force Electronic Combat organization.

Senator LEVIN. So is it fair to state, then, that the contractor is legally required at its expense to meet those specs, but that we are not sure it is capable of meeting them? Is that fair to say?

General HALL. From a performance standpoint. Are you asking from a contractual standpoint?

General SLINKARD. You can make the statement, Senator, at its expense. The contractor is legally required to pursue and to achieve the work now specified in the global restructure prime item development specification and statement of work.

Senator LEVIN. Now, after that global contract was signed we then had a problem which occurred that we were not aware of, a major problem as I understand it. Is that correct?

General SLINKARD. That is correct.

Senator LEVIN. And does he have to fix that problem under the global agreement?

General SLINKARD. If he could fix that, that problem is part of what he is required to do under the contract as it stands today, if you put aside for the moment the stop work order. So the providing of an adequate processor and an adequate architecture is part of that contract.

But I need to go back, sir, to the subject of "at its expense", because what determines at whose expense is the structure of that contract, and the structure of that contract is that when the contractor spends a buck to try to fix this, we the taxpayers spend 80 cents of it or are good for 80 cents of it, and he for 20 cents of it on that share line until we get to the ceiling, after which it is his.

Senator LEVIN. A ceiling of how much?

General SLINKARD. The ceiling at the moment in the production contract is—in the not-to-exceed amount of $3,527,000,000.

Senator LEVIN. The correction of deficiencies number is about $400 million?

General SLINKARD. That is correct.

Senator LEVIN. Thank you. My time is up.

Senator EXON. Thank you. Senator Nunn would be next and then Senator Warner.

Senator WARNER. In the absence of the chairman I just would proceed with one question. This is a question that is very much on the minds not only of the Congress of the United States but the

American public and our allies. I would ask you to provide both an answer in open session to the extent you can, and then an answer for the record as a part of the closed, classified portion of this hearing.

Having some familiarity with how the Pentagon operates, having served there for a number of years and worked on weapons programs, and now with my good friend Chairman Exon served here for 10 in this body, and Mr. Levin—we all came at the same time—we recognize that when the design specs are laid down for a system those specs are predicated on the threat as perceived at that time and as the threat is projected into the outyears as near as you can project that change in threat.

I am certain that those who worked on this program in its original phases did precisely that. So you designed an ECM system that presumably covered the threat as it existed at the time the plane was to become operational and then as far into the future as you could.

But the threat itself, in my judgment, has changed fairly dramatically and, therefore, you have a situation that is skewing; even if this ECM suite was working at 100 percent, I question whether or not it could deal with the threat as it exists today, and will be further complicated in the outyears.

Did you address the changing threat and what steps are being taken to modify this aircraft to keep pace with that changing threat so it can perform its mission?

General HALL. Yes, sir. Senator, let me address that in two areas. One, we have looked at the change in the threat over the period of time that the system has been in development and in fact in this global restructure that was mentioned earlier we reduced the requirement on the part of the contractor to pursue certain capabilities because we recognized those were no longer the threat that we had projected back when the original requirements were put together. At the same time, we added some that we have become familiar with.

In addition, as I briefed earlier in the closed session, we have gone now to the Strategic Air Command and said it has been a long time since the original package was put together. Let us revisit this and let us better define what you believe the threat requirement is going to be through the 1990s, when we need to be able to employ this as a penetrating bomber.

So Strategic Air Command is going to do that, and with that information we will continue to evolve to meet that threat. And that is the best way I can define it in open session.

Senator WARNER. Thank you very much. Thank you, Mr. Chairman.

Senator EXON. Gentlemen, isn't it true that, you know, you have taken some action, as I understand it, in this area. As I understand it, if the ALQ-161 developed and built by Eaton does not meet the performance specifications as originally designed and dictated in the contract, then the Government does get a saving.

Have you not moved some in that area? Are you not withholding some of the payments to them now for that exact reason?

General SLINKARD. Yes, sir.

Senator EXON. I do not think that is generally understood, and I think it should be in the record. I think the general perception is that you are just saying, well, things have not worked out but we are not doing anything about it.

As a former businessman, I never bought anything on the kind of a basis the Air Force had with Eaton. I bought something that was made and operated, and I thought I could sell it so I bought it. So it was a little different thing.

I suppose if I went to somebody and said, you know, give me a computer that is 4 inches wide and 6 inches long that will do the same thing as a computer that is 4 feet wide and 10 feet high, I suppose they would want some money up front from me on that before they would build it.

But can you give us the details of how much money has been withheld? I believe that you still have some concerns as of today that Eaton is not meeting the specifications for ECM as originally designed and thought possible.

General SLINKARD. Yes, sir. We started in the fall of 1986, when that broad-gauge notice of deficiencies that I mentioned earlier was issued, to withhold 25 percent of their progress payments under the full scale development contract, and that 25 percent withholding continues on to today. That amount is about $16 million.

Senator EXON. How much?

General SLINKARD. $16.3 million, to be precise. The production contract has two kinds of withholdings. The first kind is the withholding of progress payments because we are not satisfied through our contractor operations reviews with some of the ways Eaton operates and some of the systems that they have. That amounts to about $40 million.

And then, of course—and I should have mentioned this point earlier—we allowed the contractor to deliver to us hardware and software that does not meet the specification requirements. Rockwell then installed this equipment in the aircraft. We issue a specific waiver or deviation and withhold money to assure that the contractor will ultimately correct the shipsets. There is about $71 million of that kind of withholding at this time.

So right now on the production contract we are withholding payments between $110 million and $120 million, and we have been doing that for a long time.

I need to put this into context a little bit. There is no lack of concern by the Air Force about Eaton's performance under this contract, and there is no lack of intention by the Air Force to enforce this contract with Eaton as best we can under the terms and condition of the contract itself.

There have been some changes, as General Hall has pointed out, in the contract, such that what we set out to do has been changed to some degree. But we certainly intend to pursue all of the Government's rights under this contract for as long as we have this contract with Eaton.

It is, I admit, a very difficult situation.

Senator EXON. Gentlemen, I have one last question and then I will recognize my friend and colleague from Michigan to wind up with the questions he has.

Let us forget this particular problem for just a moment. I want to get your expert advice on something that comes up from time to time. And basically I am not talking about this particular program. I am talking about a program that I have been advised may come out into the open today via a possible announcement from the White House.

Without specifying it, do either one of you know what I am talking about?

General HALL. No, sir.

Senator EXON. Let me ask this question. Generally speaking, when we have black programs that for obvious security reasons we think are critically necessary, we bring those programs out into the open as quickly as we can, usually when we go into production, large-scale production. There will be some controversy if the announcement takes place today, but I have been advised it is likely to take place.

I happen to feel that this particular program, if the announcement comes out, is something that should have been brought out of the black program a long time ago. I think sometimes we keep things in the black to the point where the Soviet Union and more people in the Soviet Union know about it than people in the United States, which does not make any sense to me.

Is it true that one of the reasons we want to bring those programs out and have to bring them out is that the costs of any large production in the black is generally much more expensive than in the open?

In other words, does it not cost more to produce things under the veil of the black rather than out in the open, as we are doing with the B-1? Or does it not make any difference?

General SLINKARD. I would say, sir, I do not have any factual data on that. My observation would be that it goes both ways. Clearly in a highly classified program there are many costs associated with that security, just the security process itself. It takes more effort to do things, more effort to control things, more effort to keep track of things.

Senator EXON. More effort in secrecy in buying things?

General SLINKARD. Yes, sir. And in any program, of course, particularly if the thing is large, you know, at some point it becomes very inconvenient also just physically. The thing that may well cut the other way is that there is some streamlined management in black programs that may well offset some of these costs because of less staff interaction and less time spent answering criticism and receiving help.

Senator EXON. That is helpful to me.

What about research and development as opposed to production? Normally, it is much higher to do "black" R&D than R&D in the open?

General SLINKARD. You are talking again about black programs versus white programs?

Senator EXON. Yes.

General SLINKARD. I do not know that I could make that statement, that it would be more expensive to do R&D in a black environment than in a white environment. I just do not know that. I

know of nothing that would make that so, other than the security costs themselves.

General HALL. I think it is the administrative cost of handling the security that would be the main driver there, sir.

Senator EXON. Thank you. Senator Levin.

Senator LEVIN. Thank you, Mr. Chairman.

There has been a study made, which is a classified study by the Institute for Defense Analysis, IDA. Without getting into any of their findings, I think it is unclassified to say that your conclusions differ from theirs. Is that fair?

General HALL. Our conclusions with respect to the contribution of the ECM and what the changes to the ECM buy you in additional capability against the threat are very close.

Senator LEVIN. Do they differ, then, in terms of the penetration capability of the current ECM? Without going into the numbers, where do they differ?

General HALL. Yes. They use a different simulation and different inputs to their simulation.

Senator LEVIN. I am not trying to get that detailed. What conclusions of yours, in what area, differ from theirs, without getting into the specifics of the conclusion?

General HALL. Well, Senator, if I can put it this way, when we and they did an excursion in their study that fit with where we believe our capability is against the threat, they came out very, very close.

Senator LEVIN. Where do you differ?

General HALL. I do not think I can say that, sir, without getting into classified.

Senator LEVIN. You do differ in some significant way?

General HALL. Yes, sir, we do.

Senator LEVIN. On the question of the concurrent contract, what you have both said—I think you both have said—is that basically there never has been built an ECM of this complexity before, and that the highest risk part of the program was this ECM. Is that true?

General HALL. For the B–1 program, yes, sir.

Senator LEVIN. Why did we then produce this before it was fully developed? Why didn't we wait until we fully developed this high risk ECM before we entered into production?

General HALL. The best way I can anwser that, Senator, is I think based on our prior work on the ALQ–161 predecessor in the B–1A we felt a degree of optimism and confidence that we could do that.

Senator LEVIN. So you are saying it was not a high risk program?

General HALL. Not perceived as high risk, as high a risk as when the program was initiated.

Senator LEVIN. Was there a tight scheduling constraint you were under? Is that the reason you entered into this concurrent contract for production and design?

General HALL. Yes, sir, on the B–1.

Senator LEVIN. Isn't that the real answer?

General HALL. Yes, sir.

Senator LEVIN. Why was there a tight scheduling constraint? Why didn't we just simply develop it, make sure we had it, and then produce it?

General HALL. I believe there was a strong belief on the part of the senior leadership in this country that we needed a penetrating capability to meet the threat that went beyond the capability that existed in the B-52, and we needed it quickly.

Senator LEVIN. We had to fill a penetration gap?

General HALL. Yes, sir.

Senator LEVIN. And is it fair to say that this bomber does not have the penetration capability that we projected for it when we started building it, as we designed it?

General HALL. Sir, I will answer that only in this way. That is, the Strategic Air Command has it planned as a penetrator today. It has performed. It is ready to perform that role, if called upon.

Senator LEVIN. That is not responsive to my question.

General HALL. I know, sir.

Senator LEVIN. Does this have the penetration capability that it is designed to have?

General HALL. It has it in every regard except for the ECM system.

Senator LEVIN. Of course. Isn't the ECM an important part of its penetration capability?

General HALL. It is a part of it.

Senator LEVIN. Is it an important part of it?

General HALL. The only reason I hedge, sir, is that it is not a go/no-go that you have the full spec capability to penetrate with this aircraft.

Senator LEVIN. Is the ECM an important part of the penetrating capability?

General HALL. Yes, it is.

Senator LEVIN. Does it have the ECM capability that it was designed to have?

General HALL. No, sir.

Senator LEVIN. Thank you.

Senator EXON. Gentlemen, we will both have some questions for the record, undoubtedly, that we would appreciate your answering. I just have two questions that I want to try and wind up with. To some extent they are repetitious and yet in another sense they are not. I would like to pose the first question to you and if either or both of you want to respond to this or the second question, please do so.

As I think you can tell this morning, we are searching for an answer to this so that we can understand it ourselves and then explain it to our colleagues and the public at large, because there are an awful lot of questions going to be asked about all of this, obviously.

So at the risk of playing Monday morning quarterback on Tuesday—which we do in Nebraska as a matter of form during the football season, so it is not that out of season—let me ask this question. Could the Government, in the view of you people that have a great deal to do with executing these contracts, could the Government, prior to the Eaton award, arrange for a true fixed-price, incentive production contract or not one that limits the contractor's cost li-

ability, and be pre-acceptance and post-acceptance correction of deficiency requirement with no Government shared liability when the contractor performance is unacceptable and still have been successful in finding a qualified contractor to accept the bid?

General SLINKARD. I seriously doubt that. I would say to you, Mr. Chairman, that there were some limitations on the correction of deficiency or warranty liability for Rockwell and for Boeing, and they may have been as or more vehement in their unwillingness to take on an unbounded liability than Eaton was.

I think the circumstances under which you are going to get a contractor to take an absolutely unbounded liability on something that has not been fully developed yet are rare indeed, because you really get to a point where you have said you will bet your company because there is no limit to that liability.

One of the things I did to get ready for this hearing over the weekend was go back and look at what the Senate Armed Services Committee and the conference report said on the 1985 warranty law. And it was clear to me, at least from those committee reports, that industry and others had this kind of discussion with the Congress and that the Congress, in passing the law and in its committee comments, recognized that absolute, unbounded liability might well be something that we could not afford.

That is, we could not afford to pay the price for absolute, unbounded liability in complex systems which are not yet routine. And that is quite a different situation from someone who is going to build 2 million television sets and spread that warranty liability over all of those.

Now, a lot of judgment was involved in what the caps should be, whether there should be a cap, how much you would have had to pay for a higher cap. All of those are judgment calls, and reasonable people can differ about whether those judgment calls were made well at the time. But some judgment and tradeoff of risk versus price had to be made, Mr. Chairman.

Senator EXON. Thank you. My last question is a broad, open-ended question, and I do not want us to take all afternoon to answer it. But maybe you could generally provide us with your off-the-top-of-your-head comments. It has to do with whether or not the Air Force has learned anything by this contract, whether or not you would have issued this contract in a different manner if you were going to do it tomorrow.

Or, to sum it up, what procedure does the Air Force employ to incorporate Eaton's ALQ-161 costs and technical performance or, for that matter, any other contractor, good or bad, into future competitive awards and evaluations? I am sure that this is not the first time in this complicated matter of awarding defense contracts we have had disappointments and it sure is not going to be the last.

Would you do things differently in the future if each of you had the say-so? That is for our information because I suspect that maybe the Armed Services Committee is going to be looking with somewhat more of a critical eye in the future on these kinds of things. Help us out, if you will.

General HALL. Mr. Chairman, I think we probably would do it differently. I am convinced we would do it differently. The Chief of Staff of the Air Force has looked at the acquisition of electronic

systems like the ALQ-161 across the whole Air Force in what he calls a broad area of review. And out of that he has come up with, through some of the finest expertise, that there are better ways we can do the job.

I believe one of the key ones in that would be the creation, which just occurred, of the Air Force Electronic Combat Office, which now instead of just looking at a strategic system for a strategic aircraft will have cognizance over all electronic combat systems. So the lessons learned on the B-1 can be brought to bear on other programs that are coming, maybe in the tactical arena or the strategic, special operations forces.

We are going to have a better look at how we do this job across the whole spectrum of the Air Force. I think that insight that has come out of that review from the standpoint of acquisition, from the standpoint of test and evaluation, resources we need to do it, all of that is going to be better in the future.

Just having gone through this experience, we will have a better understanding of how to go about this complex job in the future.

General SLINKARD. Mr. Chairman, without saying how we go about it, I would simply say the Air Force has, for some time, struggled with how you look at contractor past and current performance in source selection. Where we are in competitive source selection, our Air Force Systems Command has substantially refined its system for doing that in the recent past, and it is a system which I think will work extremely well. Dr. Costello has asked that it be shown to the other services, and it has been shown to the other services.

So we are pushing hard to take contractor past performance into account. It would take too long to go through the litany of precisely how we go about it.

Senator EXON. General Hall and General Slinkard, thank you very much again. I said at the start I thank you for coming. I do that again as we close. You have been very helpful and very informative, and we appreciate your efforts very much.

We are adjourned.

[Questions for the hearing record with answers supplied follow:]

QUESTIONS SUBMITTED BY SENATOR CARL LEVIN

Senator LEVIN. What is the penetration capability of the most modern version of the B-52 in percent expected to survive? How does that compare with the current B-1B capability?

What level of penetration capability is required for the B-1B? If it is less than current capability, will your proposed fixes get us to the required level?

[Answer was not provided at time of printing.]

PROGRAM COSTS

Senator LEVIN. Was it unrealistic to promise a fully operational B-1B beginning in 1986 at a total program cost of $20.5 billion? If it wasn't, why did your contracts have such generous cost of deficiency provisions?

Weren't those provisions necessary to get a contractor to assume the high technical risk involved? Don't those provisions indicate that you expected to have significant deficiencies when the plane was first delivered? If not, how else do you explain such incredibly generous deficiency provisions?

General HALL. It was unrealistic to promise an initial operational capability (IOC) in 1986. By October 1986, fifteen B-1Bs had been delivered to Strategic Air Command ahead of schedule where they were fully integrated into the Single Integrated

Operational Plan (SIOP) as the Air Force's foremost penetrator. Fully operational maturity is not expected until the aircraft has approximately 200,000 flying hours.

Performance of the B–1B weapon system and its logistics support have continued to improve as planned. For example, a year ago a number of development challenges still remained, particularly with the terrain following and flight control systems. To date, we have flown the aircraft at its full terrain following potential--200 feet in hard ride mode over mountainous terrain at attack speeds. Similarly, the logistics system continues to mature as planned; however, full maturity will not be achieved until fiscal year 1994 when the 200,000 flight hour objective is reached.

The recently concluded independent assessment of the B–1B's operational capabilities by the Institute for Defense Analysis validated the Air Force's estimates of the B–1B's probability of penetrating enemy defenses. In short, the Air Force delivered on schedule what it promised at IOC—an operationally effective penetrating bomber that complied with a Congressionally mandated schedule.

The schedule constraints, however, necessitated a concurrent development and production acquisition strategy. The contracts with each of the B–1B associate contractors recognized the risks and liabilities associated with this concurrency and is a negotiated sharing of those liabilities.

The Air Force disagrees with the assertion that the B–1B ECM development and production contracts have generous correction of deficiency (COD) provisions. These provisions reflect a sharing of program risks between the contractor and the Government. For instance, there is no limit or cap on the contractor's liability for correcting design or other development deficiencies under the B–1B ECM full-scale development contract. There was, however, a COD cap of $75.4 million on work associated with retrofitting corrections under the ECM production contract. This arrangement was subsequently changed as a result of the contractual Global restructure such that correction of deficiencies would be accomplished on the contract's 80/20 share line with the contractor responsible for all costs beyond the contract's ceiling price. In summary, with the Global restructure, total development and retrofit liability for the ALQ–161A was brought out within the target price and ceiling price adjustments.

Given the concurrent nature of the B–1B program, it is doubtful that any responsible contractor would adopt unbounded liability on a weapon system or subsystem that has not been fully developed, or if he did, the price of the guarantee could exceed reasonable amounts the government should be expected to pay. It is unlikely a contractor would bet the future of his company on unbounded liability.

The Congress, in passing the 1985 Warranty Law (as codified in 10 USC 2403), recognized that absolute, unbounded liability might well be something the government could not afford. The SASC Committee report for the 1985 DOD Authorization Act discussed the difficulty of assessing the certainty that a new system will meet all performance requirements and that a demand for a guarantee in such a circumstance could result in a prohibitive cost. Thus, 10 USC 2403 permits an agency to negotiate reasonable exclusions and limitations (including a contractor's liability) in order to derive a cost effective warranty in light of the technical risk, contractor financial risk, or other program uncertainties.

PENETRATION GAP

Senator LEVIN. Given that the operational requirement for the B–1B was deemed to be a "penetration gap" in the mid-1980s to mid-1990s, has the failure of the B–1B to meet spec left a significant hole in our strategic deterrent?

Is there in fact a penetration gap today?

General HALL. There is no penetration gap today because the B–1B is an effective penetrator. The B–1B's capability to penetrate sophisticated defenses results from a set of carefully orchestrated design features. Among those design features are: high speed at low altitude; very low altitude terrain following system; low radar cross section; high maneuverability and a versatile navigation system; and electronic countermeasures systems that degrade enemy air defense systems that cannot be avoided. The overall penetration capability of the B–1B depends on the synergistic interaction of these factors. Other features that help to reduce/eliminate a "penetration gap" are the overall synergistic effect of the triad plus intricate planning of each and every B–1B sortie by the Joint Strategic Target Planning Staff.

WEAPON SYSTEM ACQUISITION

Senator LEVIN. General, do you believe the B–1B has been a "bench mark for future weapon system acquisition"? Or would you describe it as a set of very costly lessons learned about how not to buy a major weapon system?

General HALL. Overall, the B-1B program has been successful. The program has provided the Air Force with a very capable penetrating bomber that enhances our nation's deterrence posture. As always, there are lessons learned on any acquisition program. These lessons learned are disseminated throughout the acquisition system.

DELAYS IN THE B-1B PROGRAM

Senator LEVIN. In 1982 the Air Force told the Congress that "Delays in the B-1B program will result in the B-52s becoming increasingly vulnerable to projected Soviet air defenses which, in turn, will result in decreased target destruction probability of heavily defended targets."

Have the severe problems with the B-1B's ECM systems had the same effect? Haven't those problems resulted in "decreased target destruction probability of heavily defended targets?"

General HALL. The Air Force concern in 1982 for delays in the B-1B program did not materialize. The last B-1B was delivered to SAC in April 88 ahead of schedule. The B-1B is now the backbone of the nation's penetrating bomber force. Planning for B-1B missions continues under time-tested procedures for penetrating missions. [Deleted.] The value of ECM is in countering unexpected defenses that cannot be avoided enroute to targets.

Although the B-52 has a mature ECM system, the B-1B can penetrate Soviet defenses better than the B-52 for the following reasons: the very low altitude terrain following system and high speed at low altitude allow it to fly below much of the defensive threats while increased speed reduces exposure time to defensive threats; low radar cross section delays radar detection; high maneuverability; and ECM systems that degrade enemy air defenses.

The net result of a modernized triad, including the B-1B, is an increased capability against all target categories.

B-1B

Senator LEVIN. Last year in reference to Senator Nunn's questions about will we ever get ahead of the curve in terms of B-1B being an effective penetrator, General Randolph told us that "We will stay ahead of this curve for the time that we explained to the Congress that we would expect to stay ahead of the curve."

Was he right? Have we been ahead of the curve yet? At what level of penetrability do we get ahead of the curve, by your definition?

General HALL. The B-1B is an effective penetrator and remains "ahead of the curve." The Air Force is currently examining the operations to improve the B-1B electronic countermeasures (ECM). Providing the needed ECM capability over time is a long-term commitment requiring long-term support. In order to stay ahead of the curve, the Air Force is developing an execution plan to improve the B-1B's ECM as the projected threat evolves in the 1990s.

ELECTRONIC COUNTERMEASURES

Senator LEVIN. Last year I asked General Randolph "On ECM, how much of that is going to be at our expense, and how much at the contractor's expense?" He told me, "Sir, the contractor signed up to deliver the system at the specified numbers, and we expect him to do that."

Your testimony today tells me that you no longer expect them to do that, and that you are going to cut your losses, so to speak, take what you can get from Eaton, and get out while there is still some money in the Treasury. Is that an accurate description? Do you no longer expect the contractor to deliver the system at the specified numbers?

General HALL. The above statement inaccurately portrays the reasoned and deliberate approach taken by the Air Force to address the remaining development challenges associated with the ALQ-161. As a result of recent flight testing of the ALQ-161, the Air Force was able to clearly demonstrate that the ECM system has good capabilities against the most significant Soviet threats. However, the current system will not provide the intended capabilities against all threats without modification. The Air Force is currently assessing all prudent options for providing the full ECM capabilities required. In that evaluation we are assessing proposals by the current ECM contractor along with additional options not involving EATON. If we choose to implement the EATON solution, it will be done under the terms and conditions of the current contract. Correspondingly, if we elect not to pursue the full EATON proposal, the terms, conditions and prices of the current contract will be adjusted accordingly.

QUESTIONS SUBMITTED BY SENATOR THURMOND

Senator THURMOND. General Slinkard, what level of B-1B ECM performance was the contractor obligated to provide, and what recourse, in the form of financial or other penalties, are available to the Government?

General SLINKARD. The B-1B performance requirements are defined in the Prime Item Development Specification. Basically, the system is required to receive and identify the threat, apply specified countermeasures, and detect incoming missiles and dispense chaff and flares.

Both the ECM full-scale development (FSD) and production contracts contain tailored correction of deficiencies (COD) provisions. In addition the COD provision in the multiyear buy for Lots III, IV, and V under the basic production contract complied with the 1985 Warranty Law as codified in 10 U.S.C. 2403.

The FSD COD contract provision allows the contracting officer to direct the contractor to correct deficiencies (i.e., any condition or characteristic in any supplies or services furnished under the contract which is not in compliance with the requirements of the contract). The costs associated with the correction are allowable costs of performance. There is no cap on the contractor's liability for correcting FSD contract deficiencies discovered within six months after completion of the FSD effort.

The COD provisions for the production contract also permit the contracting officer to direct the contractor to correct deficiencies discovered up to six months after delivery of the last item. In these COD provisions the contracting officer may also direct the contractor to deliver supplies or services with known deficiencies. In this case the contracting officer may accept the supplies or services with known deficiencies subject to an equitable withhold of payment. In this regard the Air Force is currently withholding approximately $71.4 million resulting from the delivery of deficient supplies or services. If not subsequently fixed, the contracting officer may negotiate an equitable adjustment. Prior to the Global Restructure change, the costs to produce and retrofit correction of deficiencies were charged to the production contract as an allowable cost of performance and are counted against a COD cap of $75.4 million. Once the COD cap ceiling is reached, the Government would assume total cost liability for corrections. Under Global Restructure, the requirement for the Government to pay for COD over the $75 million cap on a cost reimbursement basis was deleted. Instead correction of deficiencies would be accomplished on the contract's 80/20 share line. No target profit will be included for this work. Also the contractor is totally responsible for all costs beyond the contract's ceiling price.

The primary penalty under the instant B-1B ECM contracts is the financial liability assumed by the contractor under the COD provisions as discussed above. However, the contractor also risks loss of future business if performance is poor since a contractor's past performance is considered in all source selection deliberations.

Senator THURMOND. General Slinkard, how do the B-1B ECM contracts compare with contracts for the other electronic countermeasure equipment, and what has been the experience on such systems as F-15 and F-16.

General SLINKARD. The only Air Force program which is similar enough to the B-1B ECM is the F-15 AN/ALQ-135. The F-16 uses Electronic Counter Measures (ECM) pods which were bought independent of the F-16 airframe. The B-1B defensive avionics suite and the F-15 internal countermeasures (AN/ALQ-135) system both have discrete development and production contracts that are Fixed-Price-Incentive-Firm (FPIF) arrangements with 80/20 overrun/underrun shares. In addition, the ceiling prices for the B-1B ECM range from 130% to 135% above the target cost and the F-15 ceiling price is 124%. The concurrency approach used in the B-1B program was also used in the F-15 to meet near term operational requirements. Like the B-1B, the F-15 internal countermeasures experienced technical and production problems in its early stages. However, the F-15 acquisition strategy also included a preplanned product improvement program (P31) to upgrade the system to meet producibility and reliability requirements as well as improvements for interoperability with other aircraft receivers and transmitters. The first production lot of the P31 systems was ordered in August 1987.

STAND-OFF CRUISE MISSILE CARRIER COMPARISONS

Senator THURMOND. General Hall, what are the advantages and disadvantages of the B-52H versus the B-1B as a Stand-off Cruise Missile Carrier?

General HALL. The B-52 was designed in the 1940s as a high altitude bomber before the Soviets developed a sophisticated air defense network. The B-1B was designed as a low altitude penetrator capable of penetrating modern air defenses. As confirmed by the Institute for Defense Analysis B-1B Penetration Study, the B-1B is today a capable penetrator and will continue to be able to penetrate well into the

1990s. In short, the B-52 design, which was optimized for high altitude flight profiles, is ideally suited for a stand-off cruise missile carrier. The B-1B design, which was optimized for high speed low-level flight, is the more inherently capable penetrator.

IDA PENETRATION ANALYSIS

Senator THURMOND. General Hall, what are the Air Force's views regarding the recently completed IDA analysis of B-1B penetration capabilities?

General HALL. [Deleted.] The IDA study supports the Air Force's assessments of the B-1B's capabilities when similar assumptions are used. Today's Single Integrated Operational Plan (SIOP) probability to penetrate (PTP) values for the B-1B vary from [deleted] depending on the ingress route and target assignment. By comparision, the IDA estimates for the same timeframe is [deleted] PTP. In the 1986 bomber study, the Air Force estimate for PTP values for the B-1B in [deleted] ranges from [deleted] the IDA [deleted] average PTP value is [deleted].

[Deleted.] The key differences in assumptions between the IDA study and the Air Force's assessments are in the area of [deleted]. IDA arbitrarily assumes an [deleted]. This contrasts with the [deleted] used by strategic planners in the SIOP which provides [deleted]. IDA also assumes that the Soviet's [deleted]. Current intelligence projections do not support this assumption. Finally, IDA assumes that the Soviets [deleted] for which we do not develop countermeasures.

ASSESSMENT OF THE ALQ-161A

Senator THURMOND. General Hall, do the Secretary of Defense and the Defense Science Board agree with the Air Force assessment of the ALQ-161?

General HALL. The recent flight test results of the ALQ-161 have been reviewed by the Defense Science Board and the Office of the Secretary of Defense. Both agree with the Air Force assessment that the B-1B defensive avionics, as currently configured, will not provide the specified performance. In addition, the Air Force plan for recovering the system to meet operational requirements has been endorsed by the Strategic Systems Committee on the Defense Acquisition Board.

BOMBER PENETRATION CAPABILITIES

Senator THURMOND. General Hall could you describe the importance the Air Force attaches to an assured B-1B penetration capability into the next century, given the current status of bomber counting rules in the START negotiations?

General HALL. There are a number of employment options for the B-1B in the 21st century including: penetrate, shoot and penetrate, and conventional missions. In the foreseeable future, the B-1B will be used in the penetration role, but if needed, the B-1B flexibility to perform the other missions provides strategic planners numerous ways to counter the evolving threat. [Deleted.]

B-1B CAPABILITIES

Senator THURMOND. General Hall, General Welch has stated that "no informed person can seriously doubt the capability of the B-1B to perform its designed mission today." Would you expand upon that statement, providing for the subcommittee the operational and other factors that support today's B-1B capability.

General HALL. The inherent design and performance capabilities of the B-1B are complemented by the current electronic countermeasures (ECM) system. [Deleted.] The Air Force submitted in its fiscal year 1990 budget proposal to Congress its plan for addressing existing operational electronic countermeasures requirements.

The B-1B can penetrate Soviet defenses today and in the future. This has been reconfirmed by an independent study done by the Institute for Defense Analysis. The B-1B was designed as a low altitude, high speed penetrator. Flight testing and operational evaluations have confirmed the aircraft's outstanding penetration and weapon's delivery capabilities. During terrain following it flies at 200 feet above the ground at high subsonic speed. This high speed ground-hugging technique, in concert with the low radar cross section of the aircraft, masks the B-1B in ground clutter from defensive systems. Once arriving at the target, the B-1B delivers a powerful arsenal of both strategic and conventional weapons. The B-1B can carry 24 nuclear weapons (Short Range Attack Missile, B-61, and B-83) or 84 conventional weapons (MK 82). Delivery accuracies of these weapons have been excellent. During SAC's annual bombing competition between B-1Bs, B-52s and FB-111s, the B-1B won the top award for bombing accuracy.

Operationally, the B–1B is employed in concert with the other legs of the triad. The excellent navigation and target identification capabilities of the B–1B allow the SIOP planners to plan routes which fully exploit the defense suppression inflicted upon targets struck by other triad systems and to tactically maneuver and avoid threats that might be encountered enroute to the targets.

QUESTION SUBMITTED BY SENATOR WARNER

PROBABLE COSTS FOR ECM

Senator WARNER. General Hall, what is the most probable cost of bringing the B–1B electronic countermeasures system (ALQ–161) up to a level of capability that will permit penetration of Soviet defenses through the 1990s?

General HALL. Over time the capabilities of the Soviet air defenses have evolved and they will continue to evolve in the future. As a result of this dynamic environment, the requirements for electronic countermeasures will continue to emerge in this move-countermove situation. The Air Force is currently reviewing alternatives that will address the current deficiencies in the B–1B's defensive avionics, particularly in the area of [deleted]. The concepts under study involved modifications of the current ALQ–161A system and/or the addition of a system to provide [deleted]. This program is funded with FY 88/89 R&D funds and expired Air Force budget authority. In addition, two alternatives are being evaluated which address the [deleted]. Approximately $500 million in additional funds will be required to implement either radar warning receiver option.

[Whereupon, at 12:10 p.m., the subcommittee adjourned.]